TENNESSEE REGULATORY AUTHORITY
FIRST REPORT ON
ELECTRIC DEREGULATION IN TENNESSEE

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SECTION I – EXECUTIVE SUMMARY

TVA's status as a federal entity gives the U.S. government the first move in restructuring the electric industry in Tennessee, but the General Assembly can assess its policies toward electric utilities now in preparation for that federal action. Even if restructuring takes its mildest form, revisions to electric industry tax policies, plant siting requirements, and rate setting mechanisms should be considered. Specifically, an end-user electric and gas delivery tax could replace payments in lieu of taxes in order to protect these revenues. Registration or licensing requirements for new electric generation plants, as enacted in many states, may be appropriate for Tennessee. Further, as TVA's contractual oversight of distributor rate setting disappears, the legislature may consider additional State oversight, or a new appellate process, as well as statutory standards for distributors to follow in setting rates.

We reached these conclusions (Section VII) by identifying ten (10) issues (Section V) that seem most likely to affect the future of the electric industry in Tennessee. Then we analyzed these issues in each of four (4) scenarios (Section VI) representative of likely electric industry restructuring outcomes. This led us to our proposed answers to the six (6) questions directed to the Special Joint Committee (Section VII). Each of these is summarized below.

The Issues

A. **Rates and Prices** Although Congress may impose some restrictions, it appears likely that local utilities in Tennessee will be allowed to purchase wholesale electricity from non-TVA sources in the future. Competition in electricity generation is likely to cause more volatility in prices and a narrowing in interregional wholesale price differences across the country.

B. **Stranded Costs** Competition in the electric industry will leave many utilities with investments in utility plant that can no longer be recovered. Even though Tennessee's wholesale power rates are low compared to the rest of the country, our stranded cost bill could be high. Both the amount of stranded costs and the period over which they should be recovered will be hotly debated issues.

C. **Reliability** The adequacy and security of the power system must be maintained as competition develops in electric generation. Currently, the existing generation and transmission companies work together to ensure the reliability of the entire system, because operational problems on one utility may adversely affect others on the larger interconnected system. The introduction of competition will necessitate new policies, such as oversight of the electric transmission system by independent operators, and new operating standards to assure that reliability is maintained.

D. **Market Power** As competition in the market for electricity develops, some existing power suppliers may continue to control combinations of strategic assets, such as generating plants and a transmission system. If a supplier restricts access to its transmission grid, new electricity suppliers may be unable to deliver their power to market and competition may suffer. The ability of incumbent suppliers to restrict rivals' access to key assets, or to raise the price of that access, is referred to as Market Power. Correcting Market Power problems as competition is introduced will require safeguards, such as oversight of the transmission grid by an independent operator, as well as federal legislative or agency action to address problems in interstate commerce.

E. **Universal Service** In a deregulated generation marketplace, many fear that small distributors and their customers will be unable to obtain adequate service. While this issue may be of lesser importance to Tennessee due to the prevalence of public power providers, the arrival of full retail competition will increase the likelihood that universal service problems will arise.

F. **Environmental Concerns** As deregulation attracts new electricity generators to Tennessee, the potential for increased levels of environmental pollutants merits attention. If Tennessee generators also sell power in previously inaccessible out-of-state markets, emissions may increase even more. Failure to address this issue could harm our vegetation and wildlife, as well as the quality of our air and water.

G. **Taxes** Today, TVA and the electric distributors make payments in lieu of taxes equal to approximately 5% of their gross receipts. In a deregulated marketplace, the distributors, and possibly their customers, are free to purchase from the power suppliers of their choice. If these supplies originate in other states, then taxing them as we do today may not be possible. Protecting these state and local revenues may require a change in the existing tax structure.

H. **Local Rate Setting** The authority to set retail rates for all electric distribution utilities in Tennessee ultimately rests with the State. For public power utilities, the State delegated its authority to establish retail rates to the municipalities and cooperatives themselves. The distributors then assigned some of their authority over retail rates to TVA by contract. If these contracts are set aside as a result of electric deregulation, then the full authority to set retail rates will revert back to these utilities' governing boards. In this case, the State may wish to confer some authority

to set retail rates for public power utilities on a state agency as a replacement for TVA.

I. **Consumer Education** If electricity is deregulated to the extent that consumers are free to choose their power suppliers, then consumers will need to be informed about their ability to choose and the consequences of their choices. This may require a consumer education program similar to those implemented in other states.

J. **Regulatory and Legal Issues** For over sixty (60) years, TVA has regulated the operations of electric distributors in Tennessee by contract. In a deregulated generation marketplace, with distributors and at least some of their customers free to purchase electricity from the suppliers of their choice, TVA's contractual oversight disappears. For Tennessee, this may suddenly raise questions about the proper method of regulation for electric distributors.

The Scenarios

We developed the following four scenarios to represent the results of likely federal legislation, although predicting the form of any possible federal mandate is difficult (Section IV). Moreover, each of the ten issues may lead to different outcomes within each scenario (Section VI).

A. **No federal action is taken** This scenario is simply a continuation of the status quo and requires no action on the part of the legislature.

B. **Competition in electric generation is federally mandated in Tennessee** Electric distribution utilities are allowed to choose their suppliers, but all customers still purchase a bundled service from the distributors.

C. **Competition in electric generation is federally mandated in Tennessee, with retail choice available for large commercial and industrial customers** In this scenario, the distribution utility remains the sole electricity supplier for all residential and small commercial customers. For large customers, however, the distributors will only deliver electricity from suppliers that these customers have chosen independently.

D. **Competition in electric generation is federally mandated in Tennessee with retail choice available for all customers** Under this scenario, all retail customers are free to choose their electricity suppliers. The electricity supplier takes on the responsibility for arranging delivery of sufficient power for its customers to each distributor. Each retail customer is then charged separately for the electricity provided by the customer's electric supplier and for the distributor's delivery of that electricity to the customer.

Proposed Responses to Questions for the Special Joint Committee

We suggest the following responses to the six (6) questions, as listed below, that the Special Joint Committee is charged to study.

1. **"What effect [does] Tennessee's status as a state that is provided power almost exclusively from the Tennessee Valley Authority ...have on the deregulation process?"**

   The General Assembly has jurisdiction over retail competition, retail rates, and the electric distribution function, but state initiatives in these areas can have little effect until TVA's status is altered by federal action.

2. **"What services and other functions of the electric utility industry can best achieve their goals by being subject to competition, if any, taking into account factors such as reliability, price, profit, and rates?"**

Changes in the technology of generation and in interconnectivity of the transmission grid have given hope that competition in electricity generation may reduce the average retail price of electric power. After the Federal Energy Regulatory Commission's assertion of jurisdiction over electricity generation, however, the regulatory treatment of the generation markets is largely in federal hands. Nevertheless, certain ancillary functions of the electric distribution utilities, such as meter reading, could be opened to competition today without federal involvement.

3. **"What services and other functions of the electric utility industry can best achieve their goals through regulation or a combination of regulation and competition, if any?"**

Although the Federal Energy Regulatory Commission has asserted jurisdiction over transmission and generation, the distribution function remains under state jurisdiction. In distribution, a combination of regulation and competition may be appropriate. Competition in generation is likely to force competition for large electricity customers, while small customers may be served best by a regulated bundled service from their local distribution company. To the extent retail competition is implemented, the rates charged for delivery of power supplies to retail customers over the local distributors' wires will require regulation.

4. **"Whether the electric utility industry's provision of telephone and telegraph services can enhance competition in those areas and aid the deregulation of the electric industry?"**

   Passage of Public Chapters 531 and 520 in 1997 make this question moot.

5. **"With respect to those services and other functions that should be subjected to competition, [what are] the ways and means of monitoring such services and functions to ensure that there is, in fact, competition and that competition is achieving its goals?"**

   If and when competition in the generation markets is implemented in Tennessee, an independent body should be charged with monitoring the effects on electricity prices, availability, reliability, market power, and universal service in the State. Any ancillary distribution services that are opened to competition may be monitored by the local distribution utility.

6. **"With respect to those services and functions that should be regulated, what form [should] such regulation... take and the ways and means of determining whether or not such regulation is achieving its goals?"**

   If restructuring causes TVA's oversight of the electric distribution utilities to cease, several options become available. These include: the retention of sole rate setting authority by distributors' local governing boards; the creation of an appellate process similar to that provided for customers of utility districts; or the delegation of some authority to an independent state agency to regulate the retail prices of bundled power service, or distributors' rates for delivery of competitively purchased power to end-users, or both. The effectiveness of the selected option is

then monitored by the existing local political process or the State's sunset review process as appropriate.

Other Information

The report also provides information on the current state of the electric industry (Section III), followed by summaries of recently proposed federal legislation and recent acts of the General Assembly (Section IV). The Appendices offer details on Tennessee electric distributors' sales and retail prices by customer class, a technical discussion of the transmission function, and a glossary of electric industry terminology.

SECTION II – INTRODUCTION

While some states have advanced toward deregulation of electricity, Tennessee's unique relationship with the Tennessee Valley Authority (TVA) prevents most similar actions here. TVA's status as a federal utility means that Congress must act before substantial further changes in the provision of electric power can occur in Tennessee. This report gives our views on the possible restructuring of electricity markets in Tennessee.

While the electric utility industry in Tennessee developed almost exclusively around the Tennessee Valley Authority, the electric industry outside of Tennessee developed a vertically integrated structure in which each utility owned its own generation, transmission, and distribution facilities. In anticipation of increased customer demands, these electric utilities invested in additional generating capacity. Through the 1950s and early 1960s, these additions consisted of large oil, gas, and coal fired generating plants. Because of increased economies of scale, these large plants produced energy at lower costs than older plants. By the late 1960s, however, these economies of scale were largely exhausted.

The 1970s brought nuclear-powered generating plants, as well as shortages and higher prices resulting from the 1973 oil embargo and other oil supply disruptions. In response, Congress passed the National Energy Act of 1978. The goal of the 1978 Act was to reduce dependence on foreign oil and increase energy conservation. Within the 1978 Act, the Public Utility Regulatory Policies Act of 1978 (PURPA) encouraged the development of certain non-utility generators of electricity, or cogenerators, by exempting them from federal and state regulation. PURPA further required that electric utilities purchase the power from these cogenerators.

By the early 1990s, nuclear plants provided 20 percent of the United States' total electric generating capacity. Although additional regulatory requirements for nuclear and fossil-fuel power plants added costs, the overall cost of electric generation continued to decline. This decline occurred as the increased regulatory costs were more than offset by cost savings from the increasing use of low-priced natural gas as a fuel and technological developments in the design of new power plants.

Consequently, Congress passed the Energy Policy Act of 1992 (the 1992 Act) which allowed certain investor-owned generators of electricity to sell power at wholesale rates without becoming subject to the restrictive provisions of the Public Utility Holding Company Act of 1935 (PUHCA). The Federal Energy Regulatory Commission (FERC) oversees the 1992 Act, but cannot order retail competition for electricity consumers. The Act, however, does not prohibit such action by the states. Since 1992, many states have considered the restructuring of the electric industry and several states have deregulated electricity generation by allowing retail customers to choose their power suppliers.

In April 1996, FERC issued Order 888 requiring all public distribution utilities that own, operate, or control interstate transmission services to file tariffs offering to others the same services that they provide to themselves. It also sets conditions under which a utility may seek recovery of stranded costs. Although Order 888 does not require corporate unbundling or divestiture, it does require the structural separation of utilities' transmission services from their power marketing functions. Because TVA is not currently under FERC jurisdiction, it is not required to adhere to FERC mandates, such as Order 888, except on a voluntary basis.

Also in April 1996, FERC issued Order 889, establishing an "open access same-time information system" (OASIS). This requires transmission providers set up and maintain an

electronic system to inform users of capacity availability and the current rates for transmission of electricity. Order 889 further prescribes the information to be posted on the OASIS, outlines the procedures for responding to requests for transmission service, and sets standards and protocols for sharing information.

While these governmental actions allowed increased competition in the electric industry, technological improvements in generation also moved the industry in this direction. Perhaps the most significant improvement in generation technology is the combined-cycle combustion turbine fueled by natural gas. Plants using this technology are approximately 20 percent more fuel efficient than those of earlier gas-fired designs. Independent power producers using this new technology support deregulation as an opportunity for additional sales. Likewise, large commercial and industrial consumers also support increased competition because they anticipate benefits from lower prices.

Restructuring of the electric industry is coming quickly more quickly in some parts of the country than in others. Outside of Tennessee, most states must decide whether to allow competition in electricity for retail consumers, what rules to use during any transition period, and when to let customers begin choosing their own electric supplier. Some states have already opened their electric utilities to competition, others have passed laws that set the rules for transition, and most others, like Tennessee, are still exploring the issue. It now seems likely that some form of electric deregulation will be implemented nationally in a few years, with Congress mandating certain features to assure uniformity across the states.

For Tennessee to allow customers to choose their electric supplier may mean giving choice to the electric distributors, large customers, or all users of electricity. As many new suppliers enter the market, electricity may become a competitive commodity and electric

generation a much higher risk, lower margin business. It is also possible that electricity, natural gas, telephone, home security, and water services may be provided by one retail service company. In addition, utilities may team up with companies possessing good customer relation skills, such as credit card companies or banks, to bolster their marketing efforts and promote customer retention.

The ramifications of a restructuring of the electric industry, if it occurs, will be realized over several years. At this time, one can only speculate on the end result.. This report is only an early step in evaluating the future of the electric industry in Tennessee. More study and further investigation will certainly be needed as events unfold.

The remainder of this report highlights the benefits and problems of a deregulated electric generation market for Tennessee. Section III begins with the status of the existing electric industry in Tennessee. In Section IV, various federal electric restructuring proposals and related Tennessee legislation are discussed. Section V addresses ten specific issues concerning electric restructuring and the possible effects in Tennessee. In Section VI, we identify four scenarios that are likely to develop from various electric restructuring proposals and discuss the specific issues from Section V that may result in each scenario. Finally, Section VII lays out our conclusions and recommendations.

SECTION III – CURRENT ELECTRIC INDUSTRY STATUS

In the past, the electric power industry had the characteristics of a natural monopoly. That is, it was cheaper for one firm to build and operate an integrated power system than to have several firms compete to produce and deliver electricity. Since there would be only one utility in a particular area, laws were enacted and regulatory bodies formed to ensure that electric utilities provided service to all eligible customers at high levels of reliability.

Currently, virtually all retail consumers in Tennessee purchase what can be called "bundled sales service" from the local utility, whether an investor-owned utility, rural electric cooperative, or municipality. Bundled sales service combines the different components of electricity -- generation, transmission, and distribution -- for retail consumers in the form of a "packaged" service, with customers paying one price for this service. Consumers who take bundled sales service currently have no choice but to buy all of the components from the local distribution utility. Under retail competition, consumers would have the right to buy the generation component from a third party under certain competitive conditions.

As shown in Figure 1 below, states are moving forward at different paces towards retail competition. While some states have moved aggressively in this area, others, including Tennessee, are taking a more cautious "wait and see" attitude to see how this process works.

A. The Three Stages of Electricity Supply

1. ***Generation*** is the function of producing electricity and delivering that power to the interconnected transmission grid at the required voltage level. The different types of generation plants in Tennessee include hydroelectric, coal-fired, nuclear and gas-fired combustion turbine.

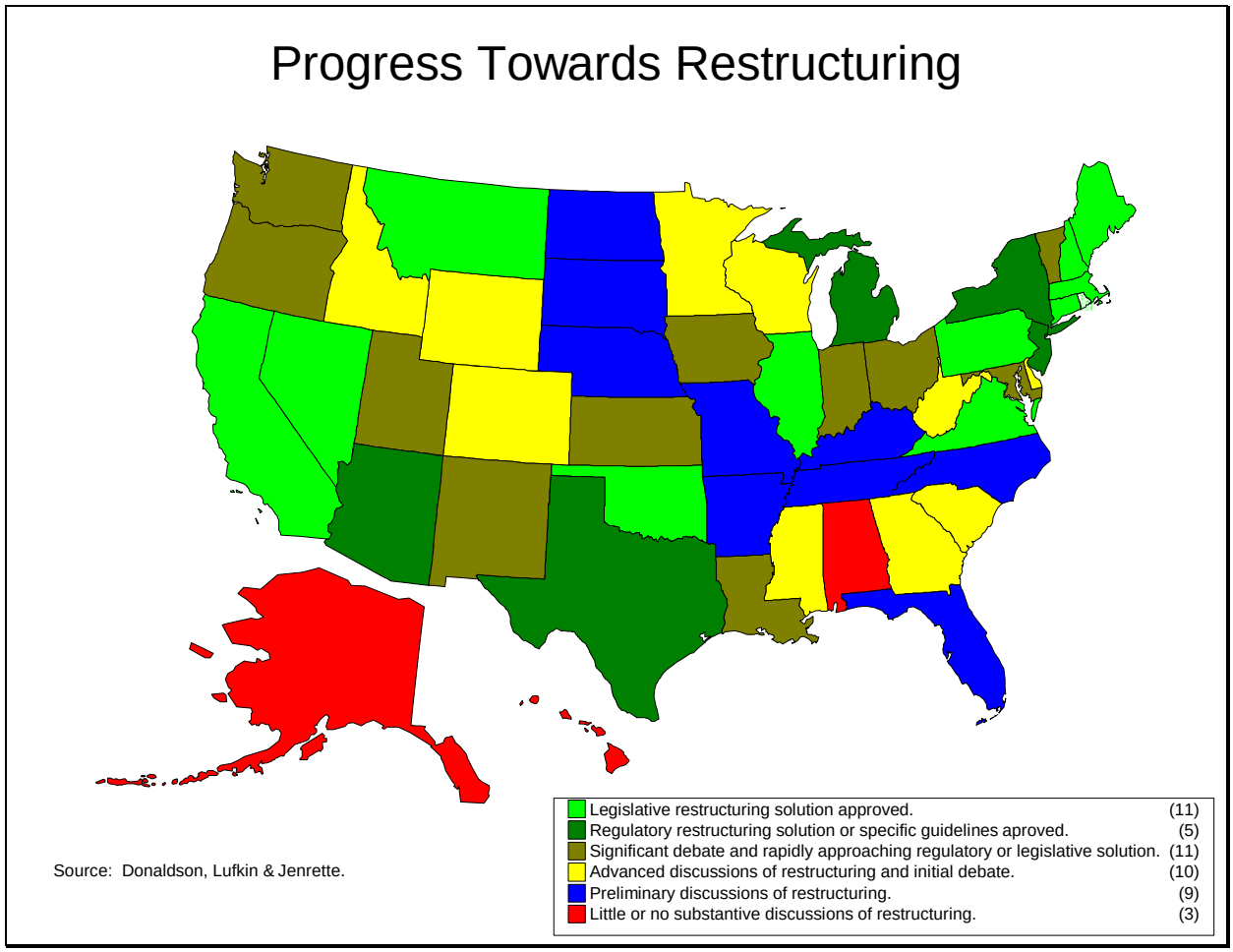


Figure 1 – Progress Towards Restructuring. (Source: Better Investing.)

2. ***Transmission*** is the function of transporting electricity at high voltage from the generators to the local distribution systems. The system connects with neighboring power systems at numerous points, and transmitters have various types of interchange arrangements with these systems. The extent and types of interchange transactions depend upon the characteristics of the systems' loads, the management policies of the systems and other factors.[1]

3. ***Distribution*** is the function of delivering electricity through local, low-voltage wires to end-use consumers from high-voltage transmission lines.

4. ***Various Degrees of Vertical Integration***. While the generation component of electric service is being opened up to competition, new forms of regulation are being applied to the

transmission and distribution (wires) sectors, which remain as natural monopolies. In the wires business, competition has been absent traditionally or is now being eliminated with the introduction of new institutions such as regional transmission system operators.

With competition in generation, new regulations will be required to deal with the problems that may arise from utilities with common ownership of generation, transmission and distribution services, otherwise known as vertical integration. Common ownership of regulated transmission and distribution monopolies on the one hand, and competitive generation on the other, may allow an integrated utility to undermine competition. For example, a vertically integrated utility could market electricity outside of its existing service territory, but limit competition inside that territory by prohibiting access to available capacity on its transmission lines. Pending federal legislation is likely to address many of these issues.

B. Current National Rate Structure

As shown below in Figure 2, Tennessee is fortunate to enjoy some of the lowest rates for electricity in the nation. Much of the reason for this is an abundance of natural resources in the area. In 1996, the nationwide average retail price of electricity was 6.87 cents per kilowatt hour. Two-thirds of the country pays electric rates below this national average, and 20 states, including Tennessee, pay below 6 cents per kilowatt hour for electricity.[2]

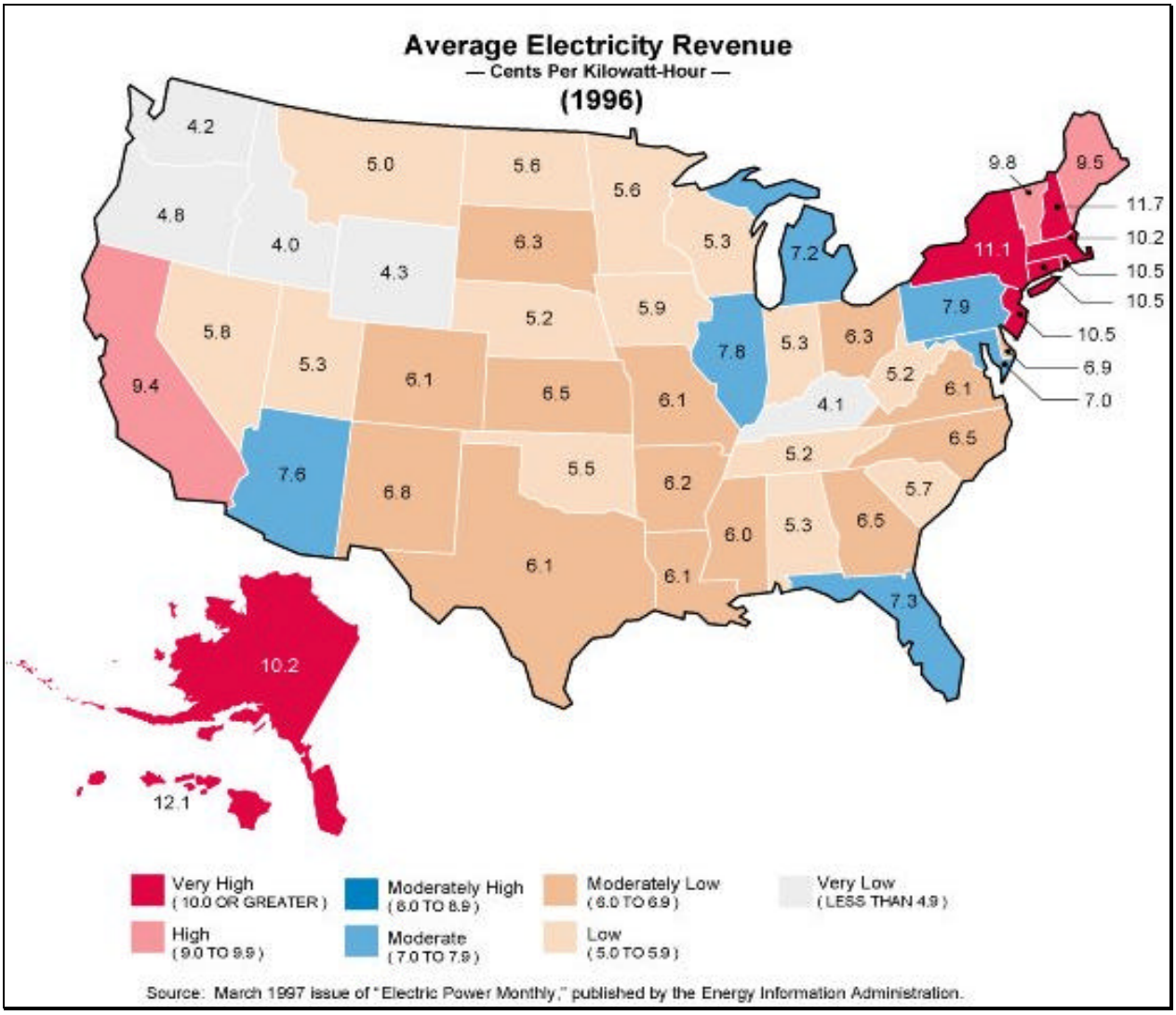


Figure 2 – National Rate Structure. Source: American Gas Association.

For the most part, those states that are moving forward with electric restructuring have rates that are higher than the national average. The average retail price of electricity in the fifteen (15) states that have restructured to date is 8.62 cents per kilowatt hour, or more than 25% higher than the national average. The supporters of electric restructuring thus far have tended to be from high-cost states, and are often industrial customers.

As shown below in Figure 3, the average retail rates in Tennessee vary according to the distributor. A further breakdown of these rates can be found in Appendices 6, 7 and 8 for the residential, commercial, and industrial classes respectively.

C. Electric Service in Tennessee

1. TVA as Generator and Transmitter

TVA's power generating capacity includes 29 hydroelectric plants, 11 coal-fired plants, 3 nuclear plants, 1 pumped storage hydroelectric plant and 4 combustion turbine plants. Generated electricity is delivered to Tennessee distributors over a transmission network consisting of approximately 17,000 miles of lines.[3] Currently, the TVA provides generation and transmission services to all but three local distribution companies in Tennessee. These three companies are investor-owned utilities who purchase their wholesale electricity from either vertically integrated generation and transmission affiliates, or from competitive suppliers in the bulk electricity. TVA also sells electricity directly to 26 large industrial and federal customers.[4]

2. Municipal and Cooperative Distributors

In Tennessee, 63 municipal and 24 rural cooperative distribution companies purchase wholesale electricity from TVA. These distribution companies accounted for nearly 70% of TVA's total sales (in kWh) for the fiscal year ended June

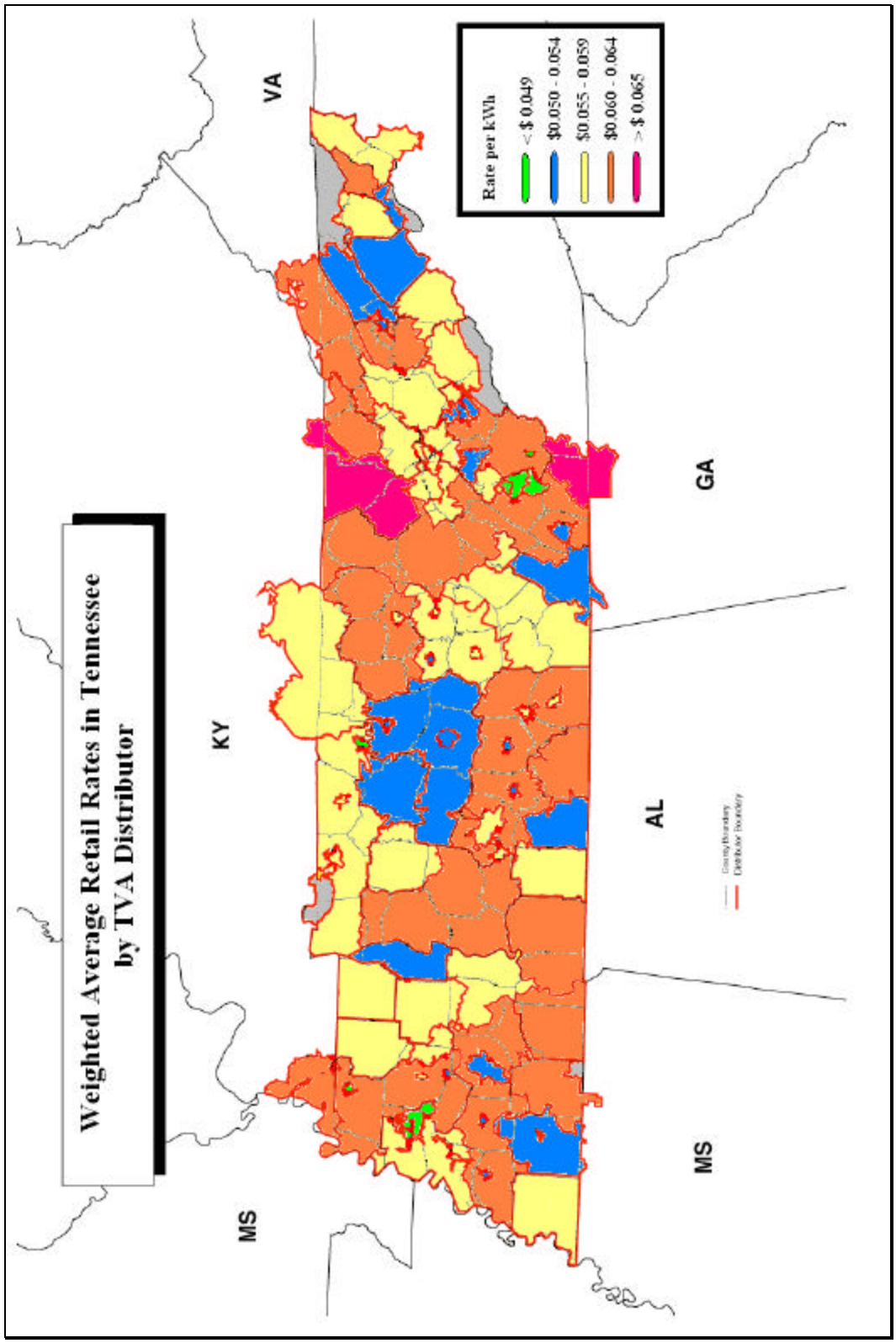


Figure 3 – Weighted Average Retail Rates in Tennessee by TVA Distributor, Fiscal Year 1997.

1997. In fact, TVA's municipal distributors in Tennessee sold roughly 55% of TVA's total wholesale output, while the Tennessee cooperative distributors sold about 15%.[5]

3. TVA Contracts with Distributors

TVA has long-term wholesale power contracts with 87 municipal and cooperative distributors in Tennessee.[6] These contracts are for terms of 20 years and require distributors to purchase substantially all of their electric power and energy requirements from TVA. In addition, most of the distributors purchase power under a provision that requires 10 years' notice to terminate the contract. TVA has indicated that these terms are necessary to provide for adequate recovery by TVA of any investment in generation, transformation, or transmission facilities for service to the distributor.[7]

A number of TVA distributors, including some with the largest loads, have expressed interest in revising the wholesale power contracts to allow more options with respect to contract term and other matters. In this regard, the TVA Board approved in 1997 the option for moving from 10-year termination notice periods to a 5-year termination notice period. These contract amendments however are being conditioned upon the notice not being given during the first five years after the effective date of the revision.

In addition, TVA's wholesale power contracts specify the wholesale rates, resale rates and terms and conditions under which the power is to be distributed. The contracts allow TVA to determine and make adjustments in the wholesale rate schedule on a quarterly basis with corresponding adjustments in resale rate schedules.

4. TVA Direct Serve Customers and Economic Development

In addition to public power distribution companies, TVA also directly serves 26 large industrial and federal customers in Tennessee.[8] TVA's contracts for these customers are normally for terms of 10 years but are subject to termination by TVA or the customer upon a minimum notice period that varies according to the customer's contract demand and the period of time service has been provided at that location. Customers that are directly served account for approximately 8 % of TVA's power revenues. The power sold directly to these customers is delivered under contracts at rates established by TVA. Such rates are the same as those charged by distributors to large industries (those with demands greater than 25,000 kilowatts).

Economic development efforts in Tennessee have succeeded at least in part because of the low electricity rates for both residential and industrial classes. Because of its unique position, TVA has been a catalyst towards economic development in areas that have long been underprivileged and underemployed. In a restructured electric market, generation utilities may no longer have the necessary incentive to cooperate with state and local governments for economic development.

5. The Fence

In 1959, Congress amended the TVA Act to place limits on TVA's sales of electricity. Specifically, the amendment restricted TVA's ability to make sales of electricity outside of its service territory as shown in Figure 4 below. This limitation has created what has become known as the "fence."

Restructuring the electric industry is likely to eliminate exclusive service territories for electric generation utilities. As applied to TVA, this would mean lifting the fence that shelters TVA's neighbors from competition with TVA by barring TVA from selling outside its historic

service territory. It also would mean repealing the provision of the Energy Policy Act of 1992, known as the anti-cherry picking provision, that protects TVA from competition by barring competitors of TVA from obtaining transmission into TVA's service territory.

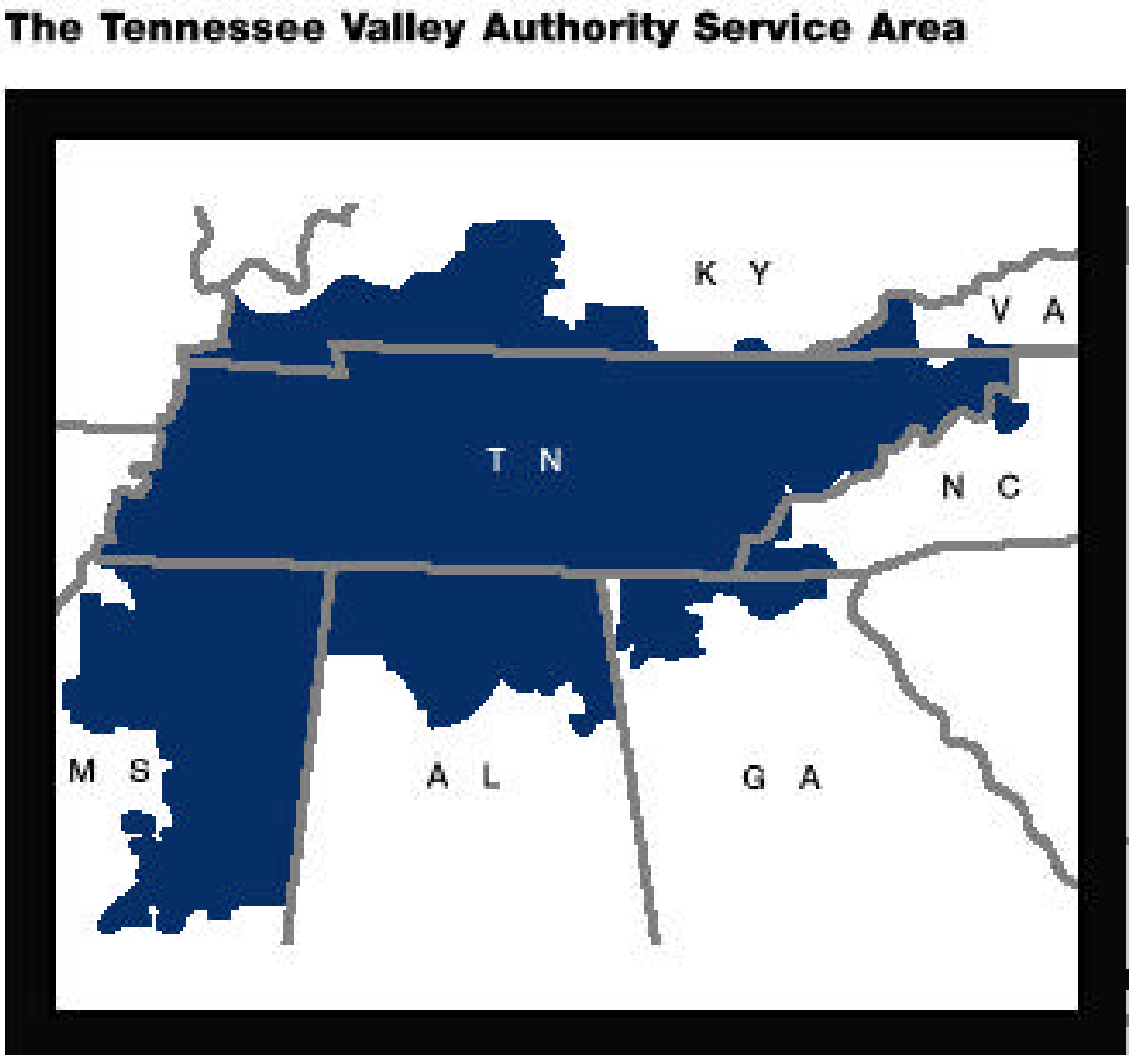


Figure 4 – The TVA Service Territory. Source: TVA 1997 Annual Report.

The biggest drivers of this proposed change in exclusive service territory are technological developments in generating electricity. It is now possible for private investors to use natural gas to generate electricity on moderate scales at rates below that of large power producers. In

addition, there is a desire by many of TVA's distributors to receive authority to purchase electricity from suppliers outside of TVA's service territory.[9]

6. Kingsport Power and Other Investor-Owned Electric Utilities

As stated above, TVA only sells electricity to public power distribution utilities. In addition, as part of its original charter, TVA regulates the retail rates for these public power distribution utilities. As such, there is only a limited amount of power in Tennessee that is supplied by the three investor-owned distribution utilities, which are regulated by the Tennessee Regulatory Authority.

Kingsport Power Company (KPC) is an electric distribution company owned by American Electric Power Company, a vertically integrated electricity supplier. In Tennessee, KPC serves approximately 43,000 customers in Kingsport, Mount Carmel, and parts of Sullivan, Washington and Hawkins Counties.

Entergy Arkansas is a division of Entergy Corporation, a vertically integrated electricity supplier. Entergy Arkansas provides service to approximately 60 customers in Tennessee in the parts of Shelby, Tipton, and Lauderdale Counties that extend over the west bank of the Mississippi River.

Kentucky Utilities Company (KU) is a subsidiary of Louisville Gas and Electric Corporation, a vertically integrated electricity supplier. KU provides service to approximately 5 customers in Claiborne County, Tennessee.

The relatively small number of Tennessee consumers served by these three investor-owned electric distribution utilities underscores the fact that TVA currently supplies nearly all of the electricity consumed in this State. Because of this fact, the remainder of this report will deal primarily with issues regarding TVA and Tennessee's municipal and cooperative distributors.

D. Federal and State Regulations

1. Current Federal Regulations

The Public Utility Holding Company Act of 1935 (PUHCA) stipulates that a utility holding company operate only an integrated electric system. After PUHCA was enacted, the number of electric utility holding companies decreased, while the number of non-affiliated electric utilities increased. This change in market structure most likely improved the effectiveness of regulation and reduced market power abuses.[10] Currently, policy-makers question the need for PUHCA's prescriptions in an electric industry that increasingly relies on competition instead of regulation to determine the price of electricity. In fact, several federal legislative proposals would repeal many provisions of PUHCA. (See Section IV-A.)

The Public Utilities Regulatory Policies Act of 1978 (PURPA) allows qualified non-utilities to participate in the wholesale electricity market. In fact, PURPA forces electric utilities to interconnect with and buy generation services from any non-utility that satisfies certain criteria established by the Federal Energy Regulatory Commission (FERC). PURPA also encourages efficient use of fossil fuels through cogeneration and greater use of renewable resources in generation.

Under the Energy Policy Act of 1992, FERC has asserted jurisdiction over all wholesale sales of electricity and transmission services, preempting the states' jurisdiction. FERC has determined that the interstate nature of the transmission grids, and the physics of electricity delivered on those grids, places all wholesale power sales in interstate commerce and subject to federal jurisdiction.

In 1996, FERC issued Orders 888 and 889, which sought to establish workable competition in generation. Order 888 provides non-utilities open access to transmission facilities,

forcing utilities to "wheel" the non-utilities' electricity over their transmission system from the generator to the purchaser. Moreover, Order 888 states that sellers and their affiliates "must not have, or must have mitigated, market power in generation and transmission and not control other barriers to entry."[11] Order 889 requires utilities that operate transmission systems to establish electronic systems to share information about available transmission capacity.

Currently, TVA is not under FERC jurisdiction, but reports only to its own board and Congress. TVA's special status exempts it from the obligations to wheel power for other generators over its transmission lines. This special status also prohibits TVA from providing generation services competitively in regions outside its service territory. Many experts, including those who represent TVA, agree that TVA should be allowed to compete to provide generation services for other regions and thus subject to FERC jurisdiction over transmission services.[12]

2. State Jurisdiction over Retail Pricing

For decades, TVA has contractually regulated and set the retail rates of the distribution utilities it serves. This situation will likely change in a deregulated marketplace since TVA will not necessarily be the sole supplier of electricity to the distribution utilities. Legislation will ultimately decide if and how to fill this void, and different options are available. Currently, twenty-two (22) states regulate the rates of electric municipal systems, and twenty-four (24) states regulate the rates of electric cooperative utilities.[13]

The unique aspect of a change in the regulatory oversight of Tennessee municipal and cooperative utilities is that, apart from contractual negotiations over retail rates with TVA, they have little or no experience with deciding the adequacy of earnings and the fair design of retail rates to each customer class. Moreover, their contractual negotiations with TVA do not have the same type of formal consumer input associated with other types of rate regulation. While

individual industrial intervention sometimes occurs in municipal and cooperative distributors' rate negotiations with TVA, there is no procedure for a group or class of residential or small commercial customers to have a voice in these rate negotiations.

E. Activity in Other States

1. High-Cost States Moving Toward Retail Competition"

Several states are attempting to implement "retail wheeling" in which all end-users, including residential and commercial customers, may purchase power from the generator of their choice.[14] The states which have moved forward in this area are generally those in which electricity prices are relatively high. With retail wheeling, the end-user may either purchase a bundled product from a power marketer or may make separate arrangements for the power transmission and distribution services.

The push for retail competition in some states is premised on expected savings to be derived from the difference between the monopoly local utility price and the unregulated wholesale cost for power. For example, in high cost states, the generation cost alone that is included in retail rates is 6 to 7 cents per kWh whereas the unregulated wholesale power price is approximately 2.5 cents per kWh. This suggests a price-gap[15] of 3 to 4 cents/kWh between the current price and the likely price under open access policies. End-users and policymakers in high cost states, see this as savings that could be captured if customer choice is allowed. In addition, power marketers are pushing this same point of view to further their business interests in open access and retail wheeling.

2. Low-Cost States Moving More Slowly – If At All

While high-cost states are moving ahead with retail wheeling, low-cost states have, for the most part, maintained the status quo. The general perception in these states is that electric

deregulation is a "zero sum game" for the states. That is, for high-cost states to save money, the electricity from low-cost states will have to be brought in. This, in turn, will cause the wholesale price of power to rise in low-cost states.

Although our analysis suggests that this is not necessarily a likely scenario, some parties in low-cost states fear a decline in the availability of low-cost power in their own states in the wake of restructuring. While the specific interests of the low-cost states differ, in general there is a consensus among them as to protecting their existing rate advantages with high-cost states. (See Appendix 11.)

If Congress mandates retail wheeling, it will also likely mandate or endorse reciprocity arrangements that guarantee that a competitor seeking entry in other states' markets face competition in the state(s) it currently serves. This may mean that in order for TVA to sell electricity outside of the fence, out-of-state generators must be allowed to sell electricity within TVA's service territory.

3. Experience with Retail Competition in Other States

Actual experience with retail competition in other states has been very limited to this point. While a number of states have implemented pilot programs, the response from consumers has been less than enthusiastic, with only a small percentage (less than 10%) opting to change their power supplier. In states that have embraced retail competition, consumer response also has been limited. The consumers' point of view seems to be that the potential of a small savings off their existing power bill is not worth changing to unfamiliar suppliers.

For example, Enron's reported goal in California was to capture 15%, or about 1.2 million, of the roughly 8 million residential and small commercial customers. To accomplish its goal, Enron reportedly spent $10 million in promotions, including two weeks of free service to

new subscribers. In the end, Enron enrolled only 30,000 new customers.[16] Because of this poor performance, Enron has delayed entry into the residential and small commercial markets across the country.

Nonetheless, the importance of the consumers' right to choose their own electric supplier should not be underestimated. A 1998 referendum in California to repeal electric restructuring was soundly defeated. Although few customers had actually switched to another electric supplier, when given the opportunity to repeal restructuring altogether, the vote was overwhelming to retain their right to choose.

SECTION IV. – LEGISLATIVE PROPOSALS AFFECTING TENNESSEE

A. Proposed Federal Legislation

During 1997 and 1998, the 105th Congress introduced several bills aimed to expand competition in the U.S. electric industry.[17] Because of other congressional priorities, these bills were not enacted. It is likely that in 1999, most of these bills will be introduced again, in one form or another, by the 106th Congress. Most proposals contain provisions to increase efficient competition in generation while allowing retail competition to spread. Some proposals contain more aggressive provisions that federally mandate retail competition in all states. The proposals often diverge on other issues that directly affect either TVA or Tennessee, or both.

Some of the proposals either repeal or amend the provisions of PUHCA that limit the ability of utility holding companies to acquire other utilities. These proposals appear to rely on the notion that open access to transmission facilities will increase competition in generation causing wholesale power prices to fall, if electric utilities may organize as holding companies. This consolidation into holding companies, which includes electric and gas utilities, is thought to allow utilities to achieve greater economies of scope and scale, thus decreasing their operating costs.

PUHCA repeal will not affect TVA directly, but will affect some utilities that serve areas bordering TVA's service territory (e.g., Southern Company, Entergy, and American Electric Power). In fact, PUHCA repeal may allow these utilities to improve the efficiency of their operations, especially generation, and enhance their abilities to compete in the wholesale power market.

In order to avoid the recurrence of market power abuses after PUHCA repeal, much of the proposed federal legislation also gives FERC and the FTC broad antitrust authority to prevent or actively discourage monopolistic behavior. For example, some plans give FERC the authority

to review utility mergers and to order utility divestiture to prevent or cure market power abuses. Also, most plans mandate FERC jurisdiction over transmission facilities, including TVA's, in order to ensure open access and reliability in transmission services.

The federal legislative proposals contain different provisions for the recovery of stranded costs under industry restructuring. Most plans allow, but do not require the recovery of stranded costs. With regard to universal service and the environment, some proposals contain federal mandates for all states, while others grant states the authority to take actions that best serve their needs.

Several proposals would allow TVA to market wholesale power outside its current service territory. Most of these proposals condition TVA's ability to sell beyond its service territory with the requirement that TVA allow competitors to enter its territory. In some plans, TVA can sell outside its territory only if TVA's territory is opened to retail competition. This condition usually accompanies a mandate for all states to implement retail competition, or a provision for reciprocity among states participating in retail competition.

The terms under which TVA is ultimately allowed to sell wholesale electricity outside its service territory likely depend on the resolution of many interrelated issues. In passing this sort of legislation, Congress must decide how to implement retail competition and expand wholesale competition while ensuring reliability and environmental protection. Ultimately, the appropriate role of TVA and the other federal power marketing agencies in a restructured electric industry is an important component of the policy issues facing Congress.

B. Tennessee Legislation

While Tennessee has continually monitored the issue of electric deregulation, it was one of the last states to officially consider electric deregulation or restructuring. This is understandable since many of the factors that precipitated the consideration of electric deregulation in other states, such as relatively higher retail rates, are not present in Tennessee. In addition, most of these other states are able to pass effective legislation that is not dependent upon congressional action to resolve questions over federal power authorities. In contrast, residential and business consumers of electricity in Tennessee have access to a reliable, reasonably priced source of electricity.

Passage of Public Chapter 531 in 1997 (codified as TCA § 3-15-801 *et seq.*) marked the first official step toward electric deregulation in Tennessee. TCA § 3-15-102 established a Special Joint Committee to study the issues of electric deregulation and its impact on Tennessee. The legislation included the following as findings:

(1) That electricity is a necessity for all individuals, industries, businesses, municipalities and counties in the State of Tennessee; and

(2) That the generation and transmission of electric power and the sale and distribution of electricity to consumers within the State are of vital importance to the citizens of this State; and

(3) That it is the policy of the General Assembly and this State to support a regulatory climate that ensures reliable electric services at reasonable prices for all consumers as a matter of public interest; and

(4) That markets for electricity are changing nationally and appear to be rapidly moving toward increased competition; and

(5) That the deregulation of Tennessee's electric utility industry could potentially have a profound impact on State resources by decreasing utility costs; and

(6) That such utility costs can further be lowered by allowing distributors of electricity in the State to engage in other type services, such as telephone and telecommunication services; and

(7) That electric utility deregulation in Tennessee could enhance the competitive position of Tennessee's businesses and industries, including Tennessee's ability to compete more effectively in business development; and

(8) That there exist significant opportunities to provide other innovative choices for electricity, and perhaps other utility services such as telephone and telecommunication services, to consumers with a deregulated electric utility industry; and

(9) That there is a need for careful consideration of all issues involving customer choice, the potential restructuring of, and competition in the electric utility industry and the present system of electric utility regulation; and

(10) That the Federal Energy Regulatory Commission and the legislatures and regulatory commissions of forty-nine states either have implemented or are studying initiatives to restructure and to increase competition in the electric utility industry; and

(11) That the deregulation of the electric utility industry in Tennessee will be more complex than in most other states because Tennessee consumers are supplied

power almost exclusively by the Tennessee Valley Authority, the Nation's largest public power supplier, which enjoys certain legal rights and protections that are not present in other markets; and

(12) That the interest of Tennessee's citizens in a competitive electric utility industry, as well as competitive telecommunication services, warrants the immediate attention of the General Assembly.[18]

In addition to the consideration of all issues pertinent to electric deregulation, the Special Joint Committee is charged by TCA § 3-15-804 to study and examine the following issues:

(1) What effect Tennessee's status as a state that is provided power almost exclusively from the Tennessee Valley Authority may have on the deregulation process;

(2) What services and other functions of the electric utility industry can best achieve their goals by being subject to competition, if any, taking into account factors such as reliability, price, profit, and rates;

(3) What services and other functions of the electric utility industry can best achieve their goals through regulation or a combination of regulation and competition, if any;

(4) Whether the electric utility industry's provision of telephone and telegraph services can enhance competition in those areas and aid the deregulation of the electric industry;

(5) With respect to those services and other functions that should be subjected to competition, the ways and means of monitoring such services and functions

to ensure that there is, in fact, competition and that competition is achieving its goals; and

(6) With respect to those services and functions that should be regulated, what form such regulation should take and the ways and means of determining whether or not such regulation is achieving its goals.

The Special Joint Committee is to make its final report to the General Assembly by February 28, 1999. Since its creation, the Special Joint Committee has held numerous hearings that have brought the issue of electric deregulation to the forefront of public debate.

A specific work product of the Special Joint Committee was Senate Bill 3198, which was considered in 1998 by the 100th General Assembly. This piece of legislation would have established a pilot program allowing a small number of municipal and cooperative electric services to provide cable television and similar services. Senate Bill 3198 did not pass.

Public Chapter 531 also included a provision that authorized municipal electric plants to provide telecommunications services codified as TCA § 7-52-401 *et seq.* Although this might not be considered deregulation, this new law certainly expands the services traditionally offered by electric utilities in Tennessee. To the extent a municipality provides telecommunications services, such municipality is subject to regulation by the Tennessee Regulatory Authority in the same manner and to the extent as other telecommunications providers. Before services are provided, the utility is required to obtain a certificate of convenience and necessity from the Tennessee Regulatory Authority. The applicant must demonstrate sufficient managerial, financial and technical abilities to provide telecommunication services. As of November 1, 1998, two (2) municipal electric companies have applied to the Tennessee Regulatory Authority for a certificate of convenience and necessity to offer telecommunications services.

In addition to Public Chapter 531, 1997 saw the passage of the "Electric Utility Comprehensive Equal Power and Authority Act," Public Chapter 520. This legislation allows all municipal electric utilities and electric cooperatives to enter into interlocal cooperative agreements pursuant to Tennessee Code Annotated, Title 12, Chapter 9. The act states as its reasoning

> "...in an increasingly competitive electric utility environment, additional services are being offered by electric utilities throughout the United States to enhance both the efficiency of electric service, and make maximum use of the facilities and assets of electric utilities; and it will be necessary for municipal electric utilities and electric cooperatives in the State of Tennessee to have the same power and authority to engage in those activities as are authorized for numerous other electric utilities throughout the United States, as well as other municipal and cooperative electric utilities in Tennessee."

This allows a municipal electric utility and an electric cooperative to exercise the authority under TCA § 65-36-101 *et seq.* to provide telecommunications services, although they will still be subject to the provisions of TCA § 7-52-401 *et seq.* and subject to regulation by the TRA.

SECTION V – ELECTRIC RESTRUCTURING ISSUES

In analyzing the status of state actions to date and the potential impact of future actions, ten (10) issues seem most likely to affect the future of the electric industry in Tennessee:

A. Rates and Prices

B. Stranded Costs

C. Reliability

D. Market Power

E. Universal Service

F. Environmental Concerns

G. Taxes

H. Local Rate Setting

I. Consumer Education

J. Regulatory and Legal Issues

The remainder of this chapter addresses each of these issues.

A. Rates and Prices

1. Generation Prices

In the early stages of electric restructuring, it is expected that most U.S. consumers will continue to purchase distribution services from their local utilities; and these utilities will buy transmission services from centralized pools, or Independent System Operators (ISOs). For distribution services, local utilities will continue to set prices according to the average cost of service. Likewise, the ISOs will likely aim to set prices for transmission services on the basis of the average cost of service. Electric restructuring should take the same early course in Tennessee also.

Meanwhile, the generation sector is expected to be the first functional service component of the electric industry exposed to competition. This will give local utilities the ability to purchase wholesale power from a number of alternative sources. Because all but three Tennessee local distribution utilities are served by TVA, changes brought by the early stages of electric restructuring may lag changes in other states. TVA is interested in participating in a competitive generation market and will likely be granted that authority by Congress. Although Congress may impose some restrictions on TVA's authority to compete in generation, at a minimum, it is likely that local utilities in Tennessee will be able to purchase wholesale electricity from non-TVA sources.

In purely competitive regional markets, prices are affected by both supply and demand factors: the supplier (with output greater than zero) who has the highest operating costs will determine the price at a given level of demand in that region.

The operating cost for the last unit of generated electricity are referred to by economists as the "marginal cost" of generation.[19] In a competitive generation market, when demand for electricity rises (falls) the generation price will rise (fall) as units of generation associated with higher operating costs are brought on (taken off) line.

More specifically, a shift to competitive pricing in generation has two important ramifications. First, generation prices are likely to become more volatile, changing with demand and supply factors. There are large swings in demand for electricity across seasons or even from hour to hour during the day. Generation prices will also be sensitive to any factors that affect the operating costs of the marginal generators (i.e., the generators used to produce the last unit of electricity). These factors may include the cost of fuel, which also fluctuates with other market forces.

This volatility contrasts with price movement associated with traditional cost-of-service pricing, which the TVA appears to use for the distributors it currently serves. Under that regulatory scheme, prices are set according to the average generating costs of all plants in service, not just those producing the marginal units. Thus, average cost pricing tends to dampen shocks arising from changes in supply factors.

The second important implication is that, with open access to transmission facilities, the range of generation prices will likely narrow across regions of the country. In competitive markets, large regional price differences for a product would affect the behavior of suppliers and consumers. Low-cost electricity suppliers would tend to enter markets with higher prices. Similarly, consumers, especially those who demand large amounts of electricity, would migrate from regions with high electricity prices to regions with lower electricity prices. In the long run, this behavior is expected to remove interregional differences in electricity prices.

The current regional differences in generation prices is largely due to the different mix of types of generation plants across regions of the country. Higher generation prices are generally observed in regions with high proportions of nuclear or oil generation plants. Lower generation prices are generally found in regions with high proportions of coal or hydroelectric generation plants. Meanwhile, prices for electricity produced by gas-fueled generation plants are generally near the interregional average. Thus, the regions of the country with the lowest generation prices are those dominated by low-cost coal or hydroelectric plants, like the TVA region.

As the generation sector opens to competition, the pace of the shift in generation prices to marginal cost largely depends on (1) whether investment in generation plant actually represents stranded investment, and if so, (2) the method by which generation companies recover their stranded investment. The smaller the amount of stranded investment or the more quickly this investment is recovered, the more quickly generation prices will approach the marginal cost of generation.

Although interregional difference in generation prices may diminish, average generation prices will not necessarily decrease as the range in generation prices narrows. In a competitive market, if average demand does not change over time, the market price will fall only if supply costs decrease over time. Electric generation costs may fall with technological advances or other cost saving changes in generation.

For example, low natural gas prices make combined cycle gas turbine facilities more cost advantageous. If natural gas prices remain low, competitive generation prices could fall, since higher cost existing plants will be used less extensively. If gas prices unexpectedly rise, however, existing plants will continue to dominate generation, and competitive generation prices would be less likely to fall.

Also, placement of these facilities is dictated by the locations of natural gas pipelines. This situation may compel gas utilities to expand into electric generation. Indeed, "convergence mergers" between gas and electric utilities are expected to rise in frequency, depending on the ultimate posture of regulatory oversight. Deployment of new, lower cost generation capacity may be difficult, however, depending on negotiations over site locations for new generation facilities.

2. Retail Prices

In addition to the expected changes in generation prices, a convergence of *retail* electricity prices across regions also depends on the extent to which transmission and distribution price components converge across regions. Many factors contribute to the range in transmission and distribution costs, including regional construction cost differences. Since material prices and labor wages are largely influenced by independent region-specific factors, construction costs are likely to continue to vary across regions of the country.

Another important factor is the size of the customer bases for transmission and distribution companies. The size of the base, measured by total consumption, determines the ability of the transmission and distribution companies to recover necessary plant investment for wires, poles and transformers. For example, in the TVA region the warm climate maintains a relatively high customer demand for electricity for air conditioning. In the Northeastern States, however, the cooler weather creates less demand for electricity for air conditioning. Also, alternative fuels for heating are more readily available in the northeastern states. Thus, compared to the TVA region, electric consumption per customer is relatively low in the northeastern states and per unit transmission and distribution costs are higher because these costs are recovered over a smaller sales base.

Differences in regional tax levels also will likely contribute to retail price disparity across regions. These tax issues are discussed in detail below.

3. Expected Changes in Electricity Prices in Tennessee

The Energy Information Administration ("EIA") of the U.S. Department of Energy has used computer modeling to simulate the effects of the transition to competitive electricity generation prices. To simulate the transition to competitive electricity generation prices, prices based on average costs (through traditional cost of service pricing) and prices based on marginal costs (through competitive pricing) were calculated for 13 regions of the country for the period 1998 through 2008.[20]

For each year of this period, a weighted average generation price was calculated. For 1998 estimates, a 0.90 weight was given to the average cost price, and a 0.10 weight was given to the competitive price. The weights were shifted over time, so that by 2008 the competitive price was given full weight (1.0) and the cost-of-service price received zero weight. Meanwhile, transmission and distribution prices were calculated from average costs throughout the projection period. That is, the EIA analysis assumes that, unlike generation services, transmission and distribution services will not be affected by competition over the projection period, 1998-2008.

This simulation provides a basis for forecasted regional electricity prices for the years 2005 and 2020. These prices are split into two parts: the price for generation only and the price for transmission and distribution combined. According to the EIA's calculations, in 2005, the range in generation prices across regions is expected to be less than 1.3 cents per kWh. By 2020, the expected range decreases further, to just over 1.1 cents per kWh.

By 2005, the EIA predicts that the range in the retail price of electricity across regions is expected to fall to 4.2 cents per kWh. By 2020, the range in the retail price of electricity across

regions is expected to fall only slightly more, to about 4.1 cents per kWh. Excluding the New York and New England regions, which have very high transmission and distribution prices, however, the expected range in 2020 across the remaining regions is much narrower, at just over 2 cents per kWh.

For the study region that includes Tennessee, the EIA forecasts generation prices of 2.47 cents per kWh in 2005 and 2.69 cents per kWh in 2020. Meanwhile, the retail price of electricity in Tennessee's EIA study region is expected to be 4.82 cents per kWh in 2005 and 5.11 cents per kWh in 2020.

By comparison, the 1996 average retail price of electricity across all rate groups in Tennessee was 5.43 cents per kWh, the lowest average retail price of any state in the EIA's study region. For the entire TVA service territory, the 1996 average retail price of electricity was 5.50 cents per kWh. Therefore, the EIA's forecasts seem to imply that retail electricity rates would fall with deregulation in the generation sector only.

It is important to note that the EIA's forecasts are based on aggregate data for several southeastern states not currently served by TVA. Due to this aggregation, the forecasts may not accurately reflect future electricity prices in Tennessee. Nonetheless, the EIA's projections suggest that, relative to future electricity prices in other regions of the country, future prices in Tennessee could remain low.

Nonetheless, there are still major uncertainties regarding the effects of electric industry restructuring on transmission service provided to Tennessee distributors. These uncertainties stem from the possibility that TVA's transmission facilities could be combined with other utilities' transmission facilities to create a larger transmission system. The two major factors that ultimately could affect transmission prices from restructuring are the recovery of stranded

investment associated with non-TVA transmission facilities and the approach taken by the transmission system operator to assure reliability.

B. Stranded Costs

Of all the issues surrounding the deregulation of electricity, some of the most critical and contentious questions deal with the identification and recovery of stranded costs. In a deregulated electric market, electricity prices are generally expected (at least in high cost areas) to become available at prices below those currently prevailing. During the transition to a competitive market, prices should be determined by market forces with high-cost utilities unable to fully recoup the embedded costs of their electric plant investments. The amount by which the embedded cost of a utility exceeds the market value of their assets is generally referred to as stranded cost.

Electric utility stranded costs are a result of investments and contractual obligations, entered into prior to industry restructuring, that will fail to produce the revenue streams anticipated in a competitive environment. The magnitude of stranded cost claims is likely to be substantial. Estimates range from a few billion dollars to as much as three or four *hundred* billion dollars, with the median range estimate somewhere between 100 and 200 billion dollars.[24] While these obligations were incurred openly under various state regulatory processes, opinions differ as to the magnitude and validity of stranded costs. The specific points at issue become evident by considering three questions:

- How are stranded costs defined and estimated?
- How should stranded costs be shared among stockholders, debt holders and rate payers?
- When and how should stranded costs be collected?

Typically, the highest estimates of stranded costs come from electric utilities and the lowest from independent power producers or consumer advocates. As noted above, stranded costs are generally estimated as the book value of an asset less its future market value. Simply stated, market value is the present value of the net revenues that can be received from the asset over its life. Market values can be larger or smaller than the book values, depending upon factors such as the age, fuel type, and operating costs of a generating asset. For example, most nuclear generating stations completed in the 1980s and 1990s have very large book values because they were expensive to complete and only a small fraction of their 40-year lifetime has been depreciated. For some plants, market values are much smaller than book values; while the differences – stranded costs – are large. For other electric generation plants, just the opposite is true; the market values are much greater than the book values, resulting in a stranded benefit.

Most of the public utility commissions that have already dealt with the stranded cost issue have required utilities to offset or mitigate stranded costs by all appropriate means to improve the market value of their electric generation assets. These include the reduction of Operation and Maintenance (O&M) expenses and capital modifications that improve efficiency.

Some believe that stranded costs are a burden that should be carried by all of the stakeholders in the electric utility business, including the utilities, ratepayers in each sector, independent power producers, owners of qualified facilities, and the population in general. The utility category can be further broken down into debt holders, who have lent money for stranded investments; stockholders, who own and control the utility; and employees, whose jobs are at stake.

Industrial users are particularly interested in securing lower electricity rates, and they view full stranded cost recovery as an impediment delaying the benefits of competition. Some

commercial and residential customers do not support full stranded cost recovery for similar reasons.

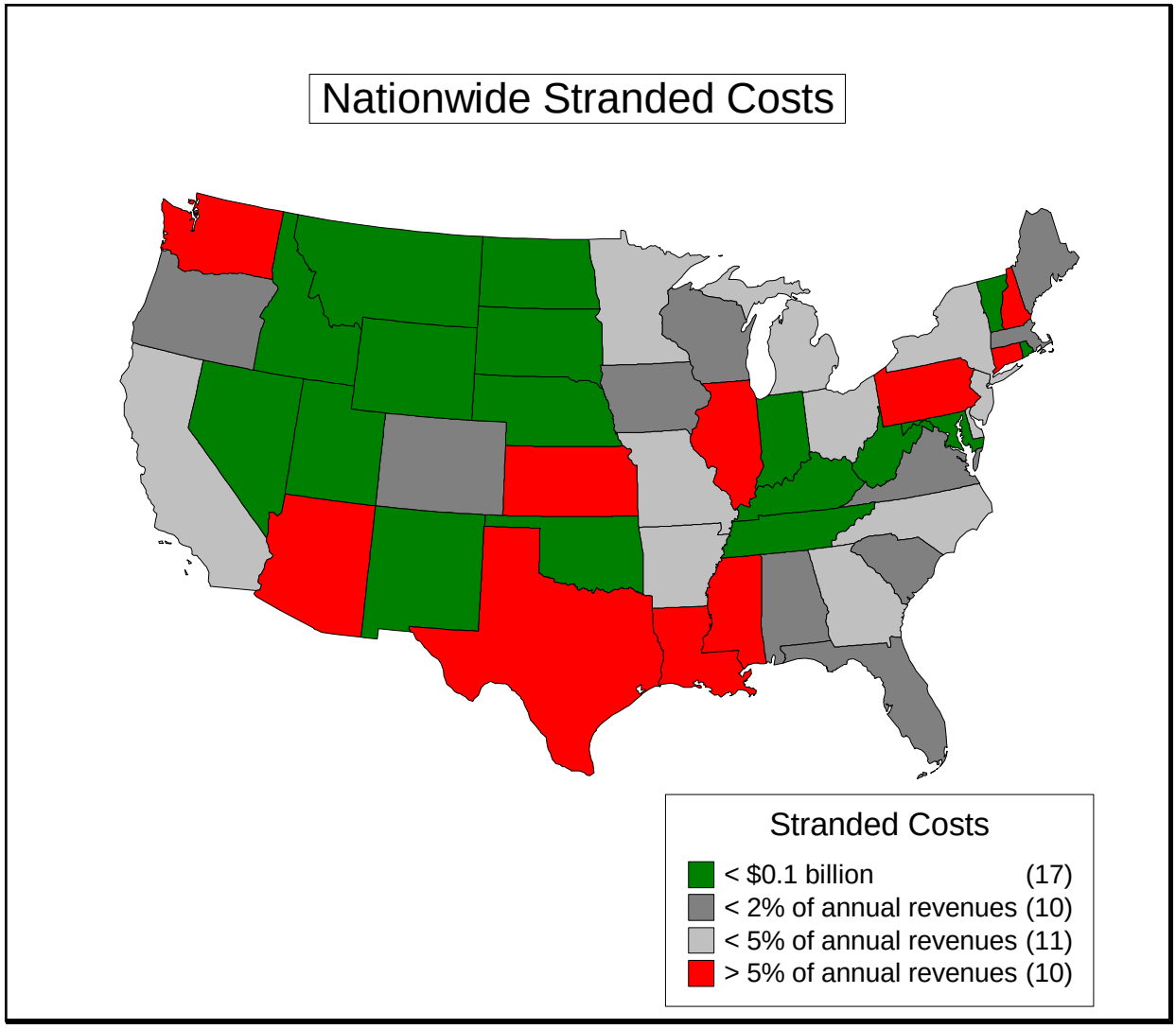


Figure 5 – Nationwide Stranded Costs. Source: American Gas Association.

The National Association of State Utility Consumer Advocates rejects utilities' claims for full recovery of stranded costs and would prefer that state legislatures and public utility commissions "determine the appropriate recovery by utilities of uneconomic costs that are stranded as a result of retail access."[25] As might be expected, any decision to assign financial responsibility for stranded costs is not likely to be viewed as acceptable to everyone.

As shown in Figure 5, Tennessee is fortunate in several respects in regards to stranded costs. However, much of Tennessee's bill for stranded costs will hinge on how these costs are defined for TVA. Specifically, stranded costs can be divided into two groups: those related to the generation of electricity and those related to the transmission of electricity. If TVA seeks to recover its outstanding debt related to the construction and later dismantlement of nuclear plants that never went online, then TVA's stranded costs could be quite high. It may be likely that TVA will seek such recovery since the classification of these costs as stranded would put TVA in a better competitive position in a deregulated market than it otherwise would be. However, many states are now requiring utilities to "net" their high-cost and low-cost generation plants in calculating stranded costs.

Tennessee's potential for stranded costs relating to the transmission of electricity could also be high. For example, the transmission system that TVA devoted to serving Bristol, Virginia is no longer used and useful utility plant. This represents a stranded cost that TVA will possess whether the wholesale price of electricity goes up or down. As such, TVA would likely want to recover these types of costs, assuming they could be identified, from its existing customer body before it enters competition and markets electricity in other areas.

TVA's existing rate structure is expected to place it in a competitive position if the deregulation of electric generation is advanced. Because TVA's existing rates are so low relative to the rest of the country, their stranded costs are generally expected to be low. However, none of the final decisions as to which costs will be classified as stranded have yet been made. Instead, we only have wide-ranging estimates from different groups for stranded costs. As such, it will likely be some time before the issue of stranded cost is finally decided.

C. Reliability

Electric system reliability is a very complex issue with numerous factors accounting for its success or failure. These factors are characterized by the industry into two general categories: ***Adequacy*** and ***Security***. Adequacy refers to the amount of generation resources needed to meet peak electrical loads. Security refers to the ability of an electrical system to serve peak demand as well as withstand the sudden changes or contingencies that occur on a daily or hourly basis. Unscheduled generator unit shutdowns or transmission line breaks are examples of such contingencies. Without adequate generator capacity, security concerns are amplified.

The electric utility industry has a unique combination of characteristics that distinguish it from other industries:

- Electricity must usually be generated as it is consumed since storing electricity is difficult and expensive;
- Electric power consumption varies widely depending on the time of day and the season;
- Electricity moves at the speed of light and many operational decisions must be made and implemented very quickly or automatically;
- Changes anywhere in the interconnected electrical systems impact all other points of the system;
- Electric system conditions change constantly as load, generation, transmission line, and distribution line configurations change; and
- The addition of new electric infrastructure (generating units and transmission lines) is capital intensive and subject to long lead times.

Historically, electric systems have been planned, designed and operated for the delivery of electric energy from fixed resources to loads, usually within defined geographical regions. Electric utilities are interconnected so that power may be transferred from one system to the other during periods of emergency or in response to economic advantages resulting from load diversity between utilities. Division of electrical load and operating limits are determined by the laws of physics and electrical characteristics of each individual utility. These factors constrain resources in terms of both adequacy and security. (For more discussion of electric system fundamentals refer to Appendix 9, Physics of an Electrical System)

Operational problems on one individual utility can also adversely impact a larger interconnected system if safeguards and restrictions are not implemented. The North American Electric Reliability Council (NERC) coordinates the efforts of interconnected electric utilities and provides necessary safeguards and restrictions. NERC establishes mandatory reliability policies, standards, principles and guidelines for its regional councils and market participants.

Consumers in Tennessee have experienced a high level of reliability through the efforts of TVA and local power distributors. TVA has implemented a program to evaluate facilities and execute changes that will ensure a high level of reliability. This program utilizes a measure called "Load Not Served" (LNS). LNS measures the amount of time per year in minutes that TVA facilities fail to provide electric service. This measure excludes power outages resulting from natural causes such as lightning, wind, or ice storm. Only outages resulting from equipment failures or improper operation of the electrical system are included.

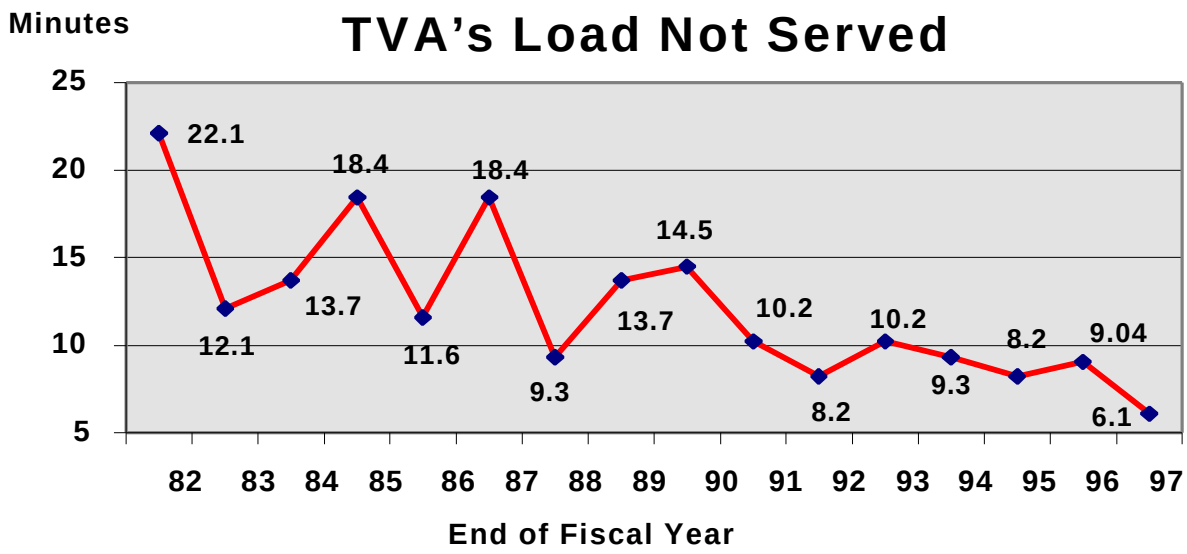


Figure 6 – TVA's Load Not Served. Source: TVA.

The illustration above indicates progress that TVA has made in reducing LNS. In 1982 the LNS value was 22.1 minutes. Over the following 15 years this value dropped to a low of 6.7 minutes in 1997. This represents a 70% decrease in LNS over the 15-year period.

Although electricity service reliability traditionally has been quite high in the U.S., reliability may be compromised by deregulation. As long as assuring any level of reliability is costly, a market determined level of reliability will never be the highest physically possible. Thus, the policy question is whether reliability will be optimal (economically efficient) given the benefits and costs of reliability to both consumers and producers. The following briefly addresses reliability issues in generation, transmission, and distribution and discusses the possible effects of electric restructuring on reliability.

Generation

A major concern of the restructuring debate is whether deregulated markets will produce sufficient generating reserves in a timely manner. Such reserves are necessary due to the lengthy lead times for construction of new generation, extended periods of generating unit outages, and unexpected load increases. TVA has experienced load growth (i.e., increased demand) of approximately 5% per year since 1991. If load growth continues at this rate, the total connected load will double in approximately 15 years. In contrast, recent trends in the U.S. indicate a reduction in planned construction of additional capacity.[26] The graph below illustrates the trend.

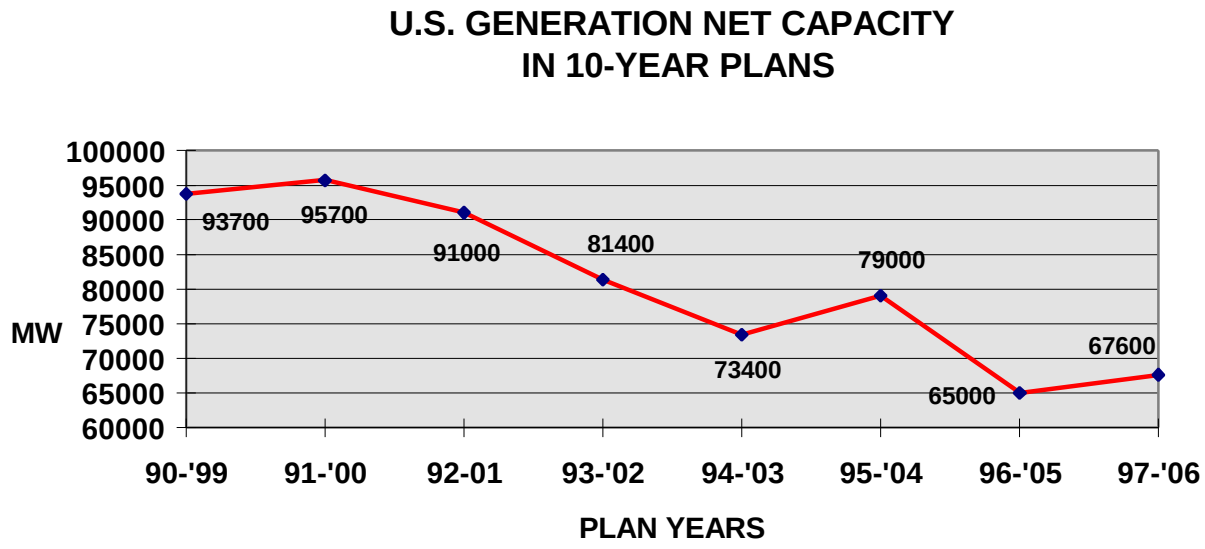


Figure 7 – U.S. Generation Net Capacity Addition in 10-Year Plans. Source: TVA.

Some states may attempt to assure adequate reserves by requiring reserve capacity for suppliers doing business within those states. These reserve requirements may be imposed through supplier certification or registration requirements. Several problems are inherent in this type of approach, however. For example, reserve generation capacity mandates may be very difficult to enforce since states may be unable to verify that reserves are available for specific transactions. In

fact, it may be difficult to prevent the same reserves from being sold several times. In addition, mandating reserve requirements may hinder the development of competition in generation by discouraging the entry of low-capacity suppliers.

As an alternative to mandating reserves in generation capacity, market forces may be used to assure these reliability standards. That is, purchasers of generated electricity could negotiate prices sufficiently high to induce generators to provide the desired reserve capacity. Even if consumers are willing and able to negotiate prices for a desired level of reliability, suppliers may provide less than the contracted level of reliability. Suppliers will find this worthwhile if doing so is worth more than the stream of returns from providing the contractual level of reliability over time. Conversely, if the returns from providing highly reliable service exceed those from underproviding reliability, the profit-maximizing generator will provide reliable service.

In economic terms, the foregone opportunity to avoid making investments in reserve capacity carries a real economic cost, known as an opportunity cost. Because of this opportunity cost, market-based generation prices should reflect a premium that is sufficient to deter underinvestment in capacity. Since electricity cannot be stored cheaply and, presumably, reliability is valued highly by customers, the market-based price premium for reliability in generation is likely to be non-trivial.

Nevertheless, a pure market solution may produce undesired levels of reliability with price premiums above the additional cost of maintaining the resulting level of reliability when there are informational asymmetries that prevent consumers from monitoring the suppliers behavior. If this or other market failures associated with generators' market power are present, the negotiated levels of reliability and the associated price premiums will not be optimal. Most legislative plans require generators to submit various data about their operations to FERC and the FTC in order to

promote honest and efficient market transactions. These plans also give these agencies authority to address other market power issues in generation.

Even with institutional safeguards, a number of other factors could threaten the supply of sufficient generation capacity in a deregulated environment. These factors include the increased risk of investment in an evolving market; greater reliance on natural gas and less fuel diversity; natural gas transmission constraints; and stricter environmental standards for coal-fired plants.

Transmission

The unbundling of high voltage transmission services is a prerequisite for competition among electric suppliers. FERC Order 888 attempted to stimulate wholesale competition by requiring that utilities offer open access transmission services. This unbundling of transmission has given rise to new operational complexities, because financial transactions do not typically reflect the actual physical path of electrical current flow. Bulk power transactions are generally based on fixed "contract paths" which do not vary with actual electrical flow conditions. Furthermore, contract-path arrangements are established individually on an assumed set of conditions, including static (i.e. fixed) electrical loads, levels of generation from specific generating units, and transmission configurations. In reality, load is never static, and generation sources as well as transmission configurations change frequently. Consequently, actual power flows can differ dramatically from the assumed contract path. Some industry participants, including TVA,[27] support contracts based on actual current paths instead of assumed contract paths.

The difference in contract-path current flow and actual current flow may increase power flows on utility systems not directly involved in the transaction. These deviations from the contract path are called loop or parallel flows and can overload transmission facilities. Virtually all

power supply transactions can impose actual flows on a third party utility system that may jeopardize the reliability of that system without providing any compensation to that party. TVA ensures the security of its transmission system by using a computer model to simulate transactions on the entire eastern interconnected grid. This model allows TVA to determine the effect on the system of planned transactions prior to the actual event.

The interconnection of electrical facilities also means that a failure or overload of a specific transmission line can result in the rapid, almost instantaneous, failure of connected facilities. Consequently, utility operators, in anticipation of potential contingencies, frequently take steps to relieve flows on critical transmission facilities that are approaching their physical limits. Parallel or loop flows greatly complicate utility operators' abilities to anticipate problems, because outside conditions (generator dispatch, scheduled power flow transactions and grid configurations of other utilities) must be evaluated. TVA for example, evaluates 500,000 such contingencies on a daily basis in order to reduce or eliminate cascading outages.

In this environment, all utility operators must rely on one another to take corrective action once potential problems are identified. This coordination is complicated by increasing wholesale competition which has increased the number of power flow transactions. During 1997, TVA experienced a 1000% increase in these transactions compared to the previous year.[28] Increasing competition in the wholesale generation markets will cause the number of transactions to increase even more and may increase the frequency and scope of system outages. The cost to society of these outages is likely to be high.

Some of the problems leading to system outages may be resolved with the development of Independent System Operators (ISOs) for interconnected transmission systems within various regions. ISO's can facilitate improved communications and coordinated operations. There are

significant obstacles to the development of ISOs which may have reliability implications, particularly in areas where power pools do not currently exist. In order to truly enhance operations, ISOs must cover broad regions. The formation of an effective ISO will, for example, require agreement among a number of utilities to relinquish operational control and planning responsibility for their transmission facilities to the ISO. This would obviously raise a number of complicated issues including: utility compensation for the use of its transmission system; ISO governance; joint planning procedures; construction of jointly planned transmission additions; and issues associated with the functional separation of transmission and generation.[29]

In order to maintain transmission and grid reliability, an ISO will require some operational control over specific generating facilities at certain times. These controls must be balanced against competitive interests if restructuring is to produce reliable electric power at competitive prices. It may be very difficult to achieve an appropriate balance given the dynamic nature of the electric system. Consequently the extent to which the ISOs control generating facilities could greatly impact the level of actual competition between suppliers and the determination of control needed by the ISO could ultimately dictate the success or failure of restructuring.

Reliability may also be affected if adequate transmission capacity is not maintained. Like planned generating facilities, planned transmission facilities have also diminished in recent years. The graph below reflects the trend.

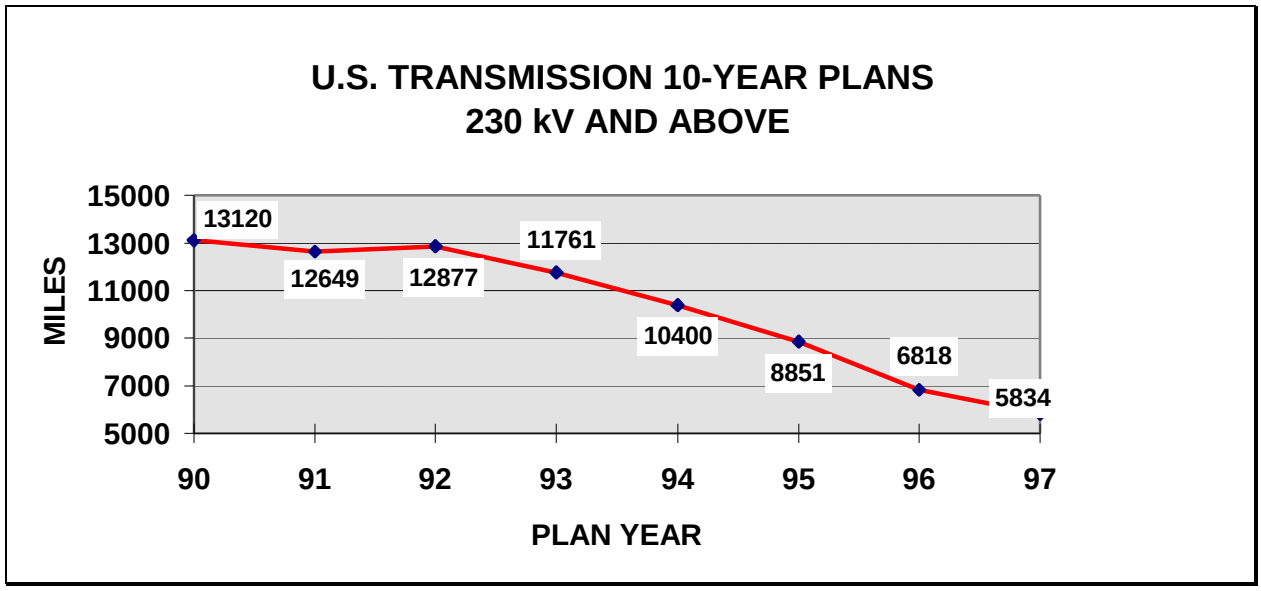


Figure 8 – U.S. Transmission 10-Year Plans 230 kV and above. Source: TVA.

As with generation, the need for prices sufficiently high to assure satisfactory levels of service reliability is also likely to affect the regulation of transmission services. If regulation of transmission services is multi-state or federal in nature, individual states or regions will have incentives to "free-ride" on the willingness of other states or regions to pay for reliability. For example, climatic and geographic conditions vary across states. This variation provides individual states the opportunity to understate their demands and overstate their costs relative to other states in order to bear the least proportion of the total costs of the shared transmission system. Such (rational) free-riding behavior among individual states or regions could result in inefficiently low transmission prices that could seriously undermine the goal of optimal reliability. In addition, multi-state or federal regulation of transmission systems may yield suboptimal reliability if political responsibility for outages can be shifted among the system's participants.

Distribution

Electric utility restructuring will have fewer reliability implications for distribution than for other electric service components, since distribution operations will not change after restructuring. Nonetheless, jurisdictional uncertainties and competitive pressures for utilities to cut costs may give rise to service reliability problems in distribution. Thus, it may become necessary to monitor distributors' commitment to service quality more closely to assure reliability.

D. Market Power

The exercise of market power results in a price above the competitive price, or above the price which would occur in the absence of market power. Market power might be exercised as electric power markets are opened to competition through the strategic abuse of essential or "bottleneck" facilities for private gain.[30] A single entity might own both generation and transmission facilities, for example, creating an incentive to manage the transmission function so as to favor the affiliated generators over unaffiliated generators. This could exclude some generators from serving end-users, or raise their costs, potentially raising the price of power to customers served from the favored generators' affiliated transmission grid. Pure generators who own "must-run" power plants may also be in a position to increase the price of electricity to end-users by threatening to withhold power at fortuitous times. This is called a "hold-up" problem. Other generators could have monopoly power from ownership of a large proportion of the generating capacity in a particular region. Consequently, restructuring proposals generally contain provisions to separate the ownership and control of generation, transmission, and distribution functions; to scrutinize mergers and/or limit the amount of generation capacity owned by a single entity; and to prevent or prohibit potential "hold-up" problems.

Market power arises in the deregulation of the market for electricity generation and accompanying opening of access to the transmission system. Further moves toward retail competition affect the market power aspects of restructuring by extending the open access issues closer to the end-users, from the transmission through to the distribution level for example. The fragmenting of buyers into small groups to implement retail competition also may exacerbate the disparities in size between buyers and sellers and facilitate the exercise of existing market power in

transmission or generation. These possibilities are discussed in more detail under the various scenarios of Section VI.

E. Universal Service

The issue of Universal Service refers to the availability of reliable electric power at reasonable rates to all those desiring service. This issue arises under electric industry restructuring from fears that small and/or rural distributors or their customers may be unable to secure reasonably priced electricity from generators, or that they will be unable or unwilling to pay the cost of extending distribution facilities to serve customers in sparsely populated areas. Southeastern states with proposed restructuring plans or guidelines generally identify the issue, but have not implemented a formal plan to address universal service for electric power at this time.[31] The issue may be of lesser importance in Tennessee due to the prevalence of public power providers. As not-for-profit entities, they may lack the profit motivation to leave costly-to-serve customers unserved and also may face legal or contractual obligations to serve all customers within their service territories.[32]

Movements toward full retail competition generally increase the likelihood that universal service problems will arise. This is discussed in more detail in Section VI.

F. Environmental Concerns

The generation of electricity contributes substantially to air pollution in the United States. Power generation plants are estimated to be responsible for over two-thirds of all sulfur dioxide ("SO^2") emissions, about one-third of all nitrogen oxide ("NO_x") emissions, and over one-third of carbon dioxide ("CO^2") emissions. In Tennessee, TVA's power generation activities are subject to various federal, state and local environmental statutes and regulations. Major areas of regulation affecting TVA's activities include air pollution control, water pollution control, and disposal of solid and hazardous wastes. Because TVA is a federal utility, it is subject only to those state and local environmental requirements for which Congress has waived federal agency immunity.

The Environmental Protection Agency recently initiated a rulemaking to reduce NO_x emissions in twenty-two (22) eastern states including Tennessee. Reductions from coal-fired utility units, such as those used by TVA for the generation of electricity, are being targeted in this rulemaking. If completed as proposed, TVA may be required to reduce emissions from its coal-fired units by more than 85 percent.[33] Although the strategy for achieving such reductions has not yet been developed by TVA, the cost of this change could be significant to TVA in a competitive generation marketplace.

The environmental impacts arising from the restructuring of the electric industry can be broadly classified into two categories: direct and regulatory oversight. Direct environmental impacts are caused by changes in generation and transmission patterns that may result from greater trading opportunities. For example, emissions may rise in regions like Tennessee where power generators have excess capacity which can be sold to previously inaccessible distant

markets as a result of open transmission access. At the same time, emissions in the purchasing region could decrease.

The second category of environmental impacts would be those caused by a change in the traditional manner in which regulation has forced electric utilities to operate. As a result of greater freedom and exposure to market forces, electric generation utilities may be likely to abandon some social objectives such as promoting energy conservation or the use of renewable energy. Previously, these social objectives were overseen by the different regulatory agencies. In a deregulated electric generation market, both existing and new entrants will not be bound by these same regulations, which will likely mean the establishment of policies that are based on economic instead of social motives.

G. Taxes

Some of the most difficult issues relating to electric restructuring in Tennessee will deal with the tax related issues of public electric power systems. In order to protect significant revenue bases in Tennessee, the legislature may need to consider the implications of existing tax structures and the changes necessary for a competitive environment.

The TVA Act requires TVA to make payments to states and local governments in which the power operations are conducted. The amount of TVA's tax-equivalent payments is basically 5 % of gross revenues from the sale of power during the preceding year, or approximately $270 million.[34] In addition, the municipal, cooperative, and investor-owned local distribution utilities in Tennessee make Payments in Lieu of Taxes ("PILOTs") to the local governing bodies of approximately $107 million.[35]

Electric restructuring could reduce the amount of tax revenues collected in Tennessee unless existing tax laws are amended. A reduction in the price of generation, reductions in property values, and increased sales by non-taxed entities outside of the State could result in lower tax revenues being collected. Also, any existing generating facilities that may be uneconomical to operate in an open competitive market could drastically reduce or eliminate these sources of tax revenues for a given region. Finally, out-of-state electric suppliers may not be subject to Tennessee Gross Receipts Taxes under current state and federal tax laws.

Typically, sales and local taxes are dependent on the price of electricity and the ability of the state to tax the seller. Also, sales taxes are generally collected from a single source--the distribution utility. Under generation competition, any sales taxes would need to be collected from numerous electric energy suppliers as well as the distribution service provider.

If deregulated electric generation advances in Tennessee, tax reform legislation may be necessary to protect state and local tax revenues. Such legislation should provide for revenue neutrality for state and local jurisdictions. Reforms should also consider the appropriate placement of taxation such as the consumption, sale, or generation points. Specifically, taxes on gross receipts or PILOTs by the electric generation may need to be eliminated in favor of some form of excise or consumption tax that would not create a disadvantage for in-state generation with out-of-state suppliers.

H. Local Rate Setting

TVA is empowered through its contracts with municipal and cooperative distributors with the authority to approve their retail rates and service. Specifically, the contracts provide for agreement between the parties on general or major changes in the resale rate schedules. In this regard, the relationship between TVA and its distributors is unique when compared with other utilities, in that the generator of electricity (TVA) has authority to dictate the resale price of electricity from the distributor to the ultimate consumer. If electric generation markets are opened to competition, this provision would by necessity be eliminated, since the distributors may at any time be purchasing power from one or several suppliers other than TVA. This change leads to the question of which, if any, regulatory agency should have retail rate oversight over electric distribution utilities in a deregulated generation marketplace.

While the municipal and cooperative **electric** distributors in Tennessee have always had their retail rates regulated by TVA, the municipal and cooperative **gas** and **water** distributors in Tennessee have no similar oversight by any regulatory body. Unlike investor-owned utilities in Tennessee which are regulated by the Tennessee Regulatory Authority (TRA), the municipal and cooperative utilities, other than electric, have always been self-regulating. The policy rationale for self regulation is that a municipal system's management is accountable to locally elected officials, who in turn are accountable to the local ratepayers. Thus, the management of the municipal electric utility is ultimately accountable to the customers. Likewise, a cooperative system's management is ultimately accountable to its members for rates and service quality.

All of this raises the question as to whether more oversight is needed for electric distribution systems in a deregulated generation marketplace than would exist in the absence of

TVA. Currently, 22 state utility commissions have jurisdiction over municipal electric systems, and another 24 have jurisdiction over cooperative electric systems.[36] It may well be that some type of rate and regulation oversight at the state level, at least on an interim basis, would be desirable for local electric distribution utilities. Such oversight would allow for public comment during this uncertain transition period to a deregulated market.

I. Consumer Education

Because electric deregulation is a complex topic, it will be necessary to develop some sort of widespread and multifaceted consumer education program. The program at its core will inform and offer assistance to consumers about the events surrounding electric deregulation. Therefore, the mechanisms to implement a successful consumer education effort should consist of a communication approach that efficiently conveys the issues associated with electricity deregulation. The approach may include, but is not limited to, mass media, interactive and/or community-based activities. The public awareness effort should first and foremost educate, and to the extent possible, encourage positive consumer action towards the goal of consumer choice. This effort should be communicated in clear and simple language.

The complexities associated with electric deregulation and the subsequent impact on the consumer will require the implementation of a universal and comprehensive consumer education program. At the program's conclusion are three primary outcomes: Education, Guidance, and Empowerment.

Intimidating and unfamiliar electric utility terms such as Generation, Transmission, and Distribution will most assuredly threaten and cause apprehension among utility consumers now faced with the new deregulated environment. Therefore, the communication approach best suited to convey the information associated with electric deregulation should be efficient, user-friendly and simplistic. A brief elaboration on the three previously mentioned outcomes is given below.

Education

A concise, yet comprehensive explanation about the nature of electric deregulation should be offered. Emphasis on the potential benefits to be gained from electric deregulation should be

stressed, i.e. consumer choice, the opportunity for lower electric bills, etc. Appropriate resources should be made available to further support asserted benefits, i.e. brochures, toll-free question lines, and community interaction events. Deliberate steps taken to educate consumers will minimize the anxiety associated with change and increase consumer confidence towards the new deregulated environment.

Guidance.

Although education will bring about greater consumer confidence, given the newness of such an environment, guidance will be needed and should be offered to assist in the transition to consumer choice. Toll-free help lines and brochures, again should assist greatly in accomplishing this goal.

Empowerment

The final result of the two previous outcomes should translate into empowerment. Through Education and Guidance, along with useful information and widespread assistance programs, consumers should be able to make informed choices that best fit their electric utility needs.

Next, the consumer education effort should not be myopic in its presentation. Great care and attention should be given to the task of addressing those most likely to be overlooked. If a state has a large percentage of senior citizens, a component of the consumer education effort should address these individuals. Likewise, if a state's body has a large, non-English speaking population or substantial number of hearing impaired/blind citizens, similar consideration should given to ensure that they are not overlooked during the transition.

Finally, considering the many options available to consumers from which to receive news and information, the consumer education effort should be inclusive in its choice of media outlets.

Local television news, daily and weekly newspapers, and the Internet are all legitimate and viable news sources that attract a sizable audience who are sure to benefit from electric deregulation information. In addition, grass-roots efforts could be employed to supplement and personalize the previously mentioned "broad-reach" media vehicles. Traditional, community-natured outlets such Rotary Clubs, Kiwanis Clubs, senior citizen groups, and churches, etc., may allow for more interaction than other forms of media and lead to greater consumer confidence.

The ramifications of electric deregulation will demand a deliberate and widespread effort to reach and educate consumers. These efforts will assist greatly as we transition to an environment of consumer choice.

J. Regulatory and Legal Issues

A discussion of electric deregulation in Tennessee should consider the existing legal framework in which electricity is delivered and priced to consumers.

1. Statutory Authority to Provide Service

Tennesseans are supplied electricity through municipal, cooperatives, or investor-owned utilities. The three investor-owned utilities provide services through the authority granted by Tennessee Code Annotated ("TCA") Title 65, Chapter 4.

Municipal electric utilities receive their authority pursuant to the "Municipal Electric Plant Law of 1935" TCA § 7-52-101 et seq. Every municipality in Tennessee has the power to acquire, improve, operate and maintain within or without the corporate or county limits of such municipality, and within the corporate or county limits of any other municipality, with the consent of such other municipality, an electric plant to provide electric service. Municipalities have the option of oversight by either a utilities board or their legislative body.

Electric cooperatives are established pursuant to the "Rural Electric and Community Services Cooperative Act," TCA § 65-25-201 *et seq*. These cooperatives, under Tennessee law, are general welfare corporations, operated on a non-profit basis and managed by a board of directors elected from their membership. They are organized to distribute electricity to their members, governmental agencies and political subdivisions. After payment of expenses and establishing certain reserves, the revenues in each fiscal year, or upon dissolution may be distributed to its members either as patronage refunds or rate reductions. Cooperatives can be sold, leased or dissolved by its members.

A unique feature of cooperatives is their ability to refuse service to potential customers. The pre-eminent mission of public power, and those charged with its distribution, is to provide the blessing of electricity to the maximum possible extent. The adoption of membership conditions tends to frustrate that purpose.

Unlike a cooperative, a municipal utility must serve all inhabitants, without discrimination and without the restrictions and conditions excepting those relating to payment.[37] The courts have ruled in favor of municipalities in disputes with cooperatives. A municipality has the exclusive power to control the distribution of electricity within its boundaries.[38] As between a Tennessee municipality and an electric membership cooperation, the city is sovereign and supreme.[39] A municipality exists for the purpose of general government. They are arms or agencies of the state and they exercise, by delegation, a portion of sovereign power for public good.[40]

2. Statutory Authority to Set Rates

With the exception of those customers served by the three public utilities, all electricity in Tennessee is provided by TVA. Municipals and cooperatives purchase from TVA the electricity they resell at rates established by the TVA Board of Directors.

TVA's setting of these resale rates is quasi-legislative in nature. The TVA Act commits the setting of TVA's rates to the discretion of the TVA board and precludes judicial review thereof.[41] One of the objects of TVA is to supply the inhabitants within its territory with cheap electric current. It does not operate for profit.

As to all public utilities, whether owned by private interests or municipal corporations, the power to set retail rates rests primarily with the state. The authority to establish retail rates has been delegated by the state to municipals and cooperatives. However, no one has the *right* to

purchase power for resale from the TVA, but if it is desired to contract with the TVA for power, it must be on terms agreeable to the TVA that are within the powers granted by Congress and such as are consistent with and directed toward accomplishment of the overall object of the TVA.[42]

Tennessee Code Annotated § 7-52-201 confers upon the city the power to contract with TVA without limitation and upon such covenants, terms and conditions with respect to resale rates, financial and accounting methods, services, operations and maintenance practices, and the manner of disposing of revenues as it deems appropriate. The same authority to contract with TVA is granted to cooperatives by Tennessee Code Annotated §65-25-205.

The contracts which TVA has entered into with the municipalities and cooperatives are predicated upon reasonable rates, and there can be little doubt but that in order to effectuate the purpose to protect the public against unjust charges, TVA reserves the right to approve any increase in rates. There is no provision in the contracts authorizing TVA either to increase or reduce rates agreed upon.

Without such a system it would be impossible for TVA, or other interested parties to ascertain the conditions of the plant, whether it was being properly managed, and whether rates exacted were reasonable and just. [43]

As noted earlier, not all TVA electricity flows through local distributors. TVA has 26 customers that it serves directly. The courts have upheld TVA's ability to choose and serve these direct customers. TVA has the right to use whatever reasonable formula it determines proper to choose its direct customers; therefore, TVA's supplying of power to a manufacturer directly rather than selling such power to municipal utility board for resale does not violate the preference provisions of the TVA Act.[44]

SECTION VI – ELECTRIC RESTRUCTURING SCENARIOS

Predicting what form any federal mandate for electric restructuring may take is not an easy task. We have developed the following four scenarios that are likely to develop from any future federal legislation.

A. No federal action is taken;

B. Competition in electric generation is federally mandated;

C. Competition in electric generation is federally mandated with retail choice available for large commercial and industrial customers only; or

D. Competition in electric generation is federally mandated with retail choice available for all customers.

This section discusses how the effects from each of the ten issues mentioned in Section V will affect Tennessee under each of these scenarios.

A. No Federal Action Is Taken (status quo maintained)

Under this scenario, the electric generation system is still operated and maintained by TVA in the same manner that it is today. It sells power to distributors at rates controlled by its mandate under federal law and the decisions of the TVA Board. The presence of the fence prevents the entry of new power suppliers over TVA's transmission grid for direct sale to distributors or end-users. Rate increases to end-users must be agreed to by TVA under its contracts with distributors. End-users would still be purchasing a bundled product from their distributor.

Rates and Prices

If there is no federal legislation, the fence stays in place, so there wouldn't be any buying or selling of power across the TVA boundary. Nevertheless, some TVA customers may choose to generate their own power using new combustion gas turbine technology. This could cause rates for residential and small commercial customers to increase.

Stranded Costs

Because this scenario is simply a continuation of the status quo, there would be no stranded costs to recover from ratepayers. Any potentially stranded assets would instead be recovered through the existing rate structure.

Reliability

While there are no changes in the current structure of the electric industry in Tennessee under this scenario, there may be external forces that influence reliability. In recent years there has been a significant increase in the number of transactions involving the movement of large blocks of electrical power between utilities. As more utilities become involved in these transactions, the effects of parallel and loop current flows will become more pronounced on all

interconnected utilities. The electrical characteristics of the TVA transmission grid make it a highly efficient and low loss transmitter of electrical power. These same characteristics, coupled with TVA's position inside the larger interconnected grid, lead to a greater percentage of the overall power movement taking place on the TVA transmission grid. This emphasizes the need for coordination between generation and transmission facilities of TVA and other utilities that make up the shared electric system. Such coordination is provided in reliability standards established by the North American Electric Reliability Council (NERC), although operation of generation and transmission facilities within these guidelines is currently voluntary. Future experience may impose a need for mandatory participation in the NERC standards by all electric utilities.

Market Power

The continuing presence of the fence confers monopoly status on TVA. TVA's ability and incentives to exercise market power are restrained by its obligations under federal law. This restraint of state granted market power by law and/or regulation was the common institutional treatment of investor-owned electric utilities before the advent of competition in electricity generation.

Universal Service

The availability of reasonably priced electricity is maintained through a combination of legal obligations and restrictions imposed on TVA and distributors in Tennessee. TVA has obligations to provide low cost power to distributors in the region under federal law, although the only oversight of its performance is provided by its own Board. The rates charged to end-users are regulated by TVA through its contractual arrangements with distributors. Distributors' obligations to serve then determine the availability of service to customers within their territories.

Environmental Concerns

Regardless of which scenario advances, the proliferation of privately owned gas turbine cogeneration systems for industrial plants will escalate in the near-term future. Current federal and state environmental laws are sufficient to deal with the siting of, and emissions from, any new electric generation facilities.

Taxes

As stated above, regardless of which scenario advances, the proliferation of privately owned gas turbine cogeneration systems for industrial plants will escalate. This bypass of the local electric system will reduce local and state tax revenues. The legislature may want to address this concern through a more in-depth study.

Local Rate Setting

If no federal action is taken on restructuring, TVA would continue to have oversight of the municipal and cooperative electric distribution utilities in Tennessee. Therefore, no additional regulation by the State is needed.

Consumer Education

Since no federal action is taken, and consumers are still served by their existing distribution utility, no state-wide consumer education effort is required.

Regulatory and Legal Issues

The maintenance of the status quo does not affect the legal and regulatory framework currently in place.

B. Competition in electric generation is federally mandated

Under this scenario, only the electric generation system is open to competition. This means that the distribution systems would be free to purchase power from whomever they choose while end-users would still be purchasing a bundled product from the distributors. Depending on federal legislation, TVA could sell power to distributors outside of its traditional service area.

Rates and Prices

In this case, retail electricity prices will likely be determined by market forces affecting generators. Generation prices are likely to become more volatile, rising and falling with fuel costs and demand shocks. Generation prices also will likely converge across regions of the country, although questions remain concerning the level at which generation prices may converge. In any event, retail prices will follow the movement of generation prices.

Stranded Costs

In a competitive generation marketplace, some of TVA's plant investment will no longer be useful. While this stranded cost is expected to be low for TVA, the exact amount is not presently known since it depends on the level of the ultimate wholesale power price. If not decided at the federal level, then the legislature may need to address how stranded cost is determined and passed on to the distributors.

Reliability

To implement competition in generation, generation and transmission facilities must be separated. When vertical integration is removed, then operational efficiencies and coordination may be lost, and reliability degraded. For continued provision of reliable electric power it is imperative that the operator of the transmission grid have the ability to monitor available capacity,

track individual transactions, evaluate the effects of each on the system, and communicate necessary operating parameters to each participating utility. To ensure coordination of generation and transmission facility operation, focused on reliability, guidelines such as those provided by NERC should be followed. Costs associated with establishment and operation of ISOs with technologically advanced facilities required for reliable electric power may negatively impact rates.

Moreover, the additional bulk power transactions occurring under this scenario would only serve to further increase operational complexities and threaten reliability. Additional transactions increase the number of parallel and loop current flows that must be evaluated. For example, a spike in load growth may result in some regions due to wholesale competition. If a major shift in power source occurs between regions, the interconnecting transmission facilities could be subjected to loads never before realized and cascading outages might result.

To address these concerns, proposed federal legislation would give FERC authority to register and oversee an electric reliability organization that would establish and enforce mandatory reliability standards. This organization would include all entities critical to reliability, such as transmission system operators, and would be open to all entities that use the bulk power system. Until the reliability organization is established, FERC should encourage all organizations to comply with the existing standards established by the NERC. FERC may delegate its enforcement authority of these standards to state agencies, similar to the federal/state agreement contained in the Natural Gas Pipeline Safety Act of 1968. This would allow each state to offer one-stop shopping for all state, local, and federally-designated permits for the construction and operation of eligible generation and transmission facilities.

Market Power

Whether any entity possesses market power in Tennessee in this scenario depends on the changes, if any, in federal law affecting TVA. For example, TVA could be treated the same as other electric utilities subject to FERC jurisdiction. This requires, at a minimum, the separation of generation and transmission assets into distinct entities (separate subsidiaries for investor-owned utilities). The Administration's Plan also requires the turnover of control of transmission facilities to an Independent System Operator and empowers FERC to order divestiture of generation capacity to remedy market power problems in the resulting wholesale market. Moreover, "open access" to the transmission grid would cause TVA's fence to come down.

Whether TVA would have any market power in this case is far from certain. TVA, and generally Tennessee as well, is surrounded by a number of large electric utilities which could become alternative sources of power for Tennessee distributors.[45] Open access will afford an opportunity for entry by independent power generators to build plants in or near Tennessee and sell power to distributors over TVA's grid. Also, some distributors may find construction of their own generation capacity worthwhile.

The key to solving market power problems in this case is the guarantee of open access to the transmission grid. This might be achieved in several ways. TVA's generation capacity could be sold to the highest bidder, leaving TVA as a transmission-only entity under FERC regulation. Alternatively, TVA could retain ownership of all its assets, but cede control of the transmission grid to an Independent System Operator overseen by FERC. Or, the transmission grid might be sold to the current TVA distributors for operation by a distributor-appointed board, leaving TVA as a power generator only. Electric utilities in other states have accepted similar divestments in return for recovery of some stranded costs in retail rates under comprehensive state legislation.[46] Any similar solution for TVA must take place, at least in part, at the federal level.

Universal Service

In this scenario, distributors will be responsible for securing their own power supplies, while TVA's obligation to favor in-region distributors with low wholesale rates is presumably removed. Small distributors may then find supplies of low-priced power limited or unavailable and may also lack the ability or incentive to generate their own power economically and reliably. As a result, retail rates might be forced up by rising wholesale rates, endangering universal service.

While this possibility cannot be completely ruled out, it is far from certain. Similar fears, for example, accompanied the opening of the natural gas supply markets to competition. In the natural gas industry, the interstate pipelines under regulation by FERC had played the role of TVA for local natural gas distributors across the country. Allowing competition in gas supplies permitted distributors to seek their own contracts with natural gas producers and to transport gas to their systems through interstate pipelines at rates set by FERC. Fears arose that small distributors might lack the size necessary to contract for economical and reliable supplies of gas, as well as ancillary pipeline services, such as storage. These fears proved unfounded as distributor associations, marketers, and other "aggregators" arose to provide the desired bundles of gas supply and services to small distributors.

Nevertheless, if wholesale rates rise in this scenario due to the equalization of wholesale electric rates across geographic areas, then this cannot be mitigated by the actions of aggregators. Whether this will occur at all, and its magnitude and extent if it does, are highly uncertain at this time. Thus, the need to take action on such a speculative outcome does not appear justified. Monitoring rate changes during a transition to wholesale competition is prudent and will alert the legislature to any necessary action.

This outcome requires that open access to the transmission grid is established and maintained, such that access of buyers and sellers to the grid is not artificially restricted. It also requires that distributors current obligations to serve are maintained.

Environmental Concerns

Regardless of which scenario advances, the proliferation of privately owned gas turbine cogeneration systems for industrial plants will escalate in the near-term future. Current federal and state environmental laws are sufficient to deal with the siting of, and emissions from, any new electric generation facilities.

Taxes

Because the distributors would be free to purchase wholesale power from sources other than TVA, the payments in lieu of taxes that TVA currently provides would be eliminated as described in Issue G. In addition, since many of the new wholesale power providers would be out of state, it would be questionable whether Tennessee could tax these sales under current statutes. As such, the State may want to consider legislation protecting state and local revenues under this scenario.

Local Rate Setting

For several years, TVA has regulated local rates through its contracts with the electric distributors. With electric distributors free to purchase power from new sources, TVA would no longer have control over local rate increases through their power contracts. The delegation of authority to set retail rates by the State will remain with the local utility. Given the lack of statutory guidance over municipal and cooperative retail rate setting, the legislature may consider delegating to a state agency direct or appellate authority to consider matters involving retail rates.

Consumer Education

Deregulation of generation would not require a consumer education program. Since competition is limited to the electric generation utilities' sales to distributors, marketing of these services can be handled by the generation utilities themselves.

Regulatory and Legal Issues

If municipal and cooperative electric companies are free to purchase power for resale from entities other than TVA, the supervision exercised by TVA through its contracts over rate increases will be gone. The delegation of the authority to set retail rates will remain with the local utility. The management of each municipal or cooperative electric company will have sole authority to set retail rates.

In addition, various other requirements that TVA places on its local distributors will be eliminated. For example, requirements over the electric distributors independent audits, accounting regulations, billing, and operational requirements are contained in the contract with TVA. With the elimination or modification of these contracts, statewide electric regulatory oversight will be diminished. Given the lack of statutory guidance over municipal and cooperative rate setting and operations, the legislature may consider delegating to a state agency authority over these matters.

C. Competition in electric generation is federally mandated with retail choice available for large commercial and industrial customers only

Under this scenario, electric generation is open to competition and large commercial and industrial customers are allowed to choose their supplier. The distributors continue to determine the supplier of electricity for the residential and small commercial classes only. In addition, the distributors will continue to deliver electricity to their large commercial and industrial customers. Because electric generation is open to competition, all of the issues outlined in Scenario B apply here also.

Rates and Prices

A large customer which purchases all of its electric requirements from a single supplier and then transports or "wheels" this electricity to its different sites can achieve significant economies. The large customer's purchases may, in fact, exceed the total requirements of the distribution utilities serving many of its individual sites. By consolidating its purchases, the large customer obtains bargaining power with suppliers and is able to negotiate a lower price than it would have received from its individual electric distributors. Since these large customers are perceived to be well informed, there are very few new issues that arise that have not been discussed in the previous scenarios. Because of this customer's knowledge of electric markets, there appears to be little need for additional protections in this environment.

Retail choice among large industrial and commercial customers may spur entry into generation, which may lead to further reductions in wholesale rates. As large customers purchase their own supplies the bargaining power of the distributor may be reduced. The distributors are now purchasing less power from suppliers than under Scenario B and their ability to negotiate with suppliers is reduced. Consequently, the distributor's wholesale power price may increase as

will the retail price to its remaining customers. This implies that the delivered price to industrial customers may fall while the delivered price to residential and small commercial customers may rise. Industrial rates may fall under this scenario, it is likely that local distributors will balance these reductions with increases in residential and small commercial rates. Even if entry in generation causes average prices to fall, the benefits may not be evenly distributed across customer classes.

Stranded Costs

In a competitive generation marketplace, some of TVA's plant investment will no longer be useful. While this stranded cost is expected to be low for TVA, the exact amount is not presently known since it depends on the level of the ultimate wholesale power price. If not decided at the federal level, then the legislature may need to address how stranded cost is determined and passed on to the distributors. While the stranded costs, if any, for the distributors under this scenario would be minimal, the added complexities of managing multiple power supplies for large customers may cause a small increase in costs to the distributors.

Reliability

Although similar to Scenario B, the addition of choice for industrial customers will impose greater operational complexity on the transmission operator. As the number of transactions increases as large customers purchase their own power supplies, the risk of power outages also increases.

Market Power

The market power issue here is similar to Scenario B, except that the power buyers are not just the distributors of electricity, but also the large commercial and industrial users. The market power issue is now expanded because the distribution companies may deny access to the transmission grid for large customers. The cure for market power then rests with open access to the transmission and distribution grids for potential buyers and sellers of electric power.

This scenario, however, does open the door for several large customers to band together to build generation capacity that no single customer could justify on its own. A single customer might justify a single gas-turbine electricity generator, but it would have no backup if that generator went down or was shutdown for maintenance other than buying power from the distributor. Purchase of an additional generator that would stand idle much of the time may not make economic sense. Four customers, however, could invest in five generating units and hold one in reserve, cutting the cost of backup by 75%. In fact, this ability on the part of large buyers is likely to cause competition to spread to large customers even if it is initially limited as in Scenario B.

Universal Service

There is little additional threat to universal service over that in Scenario B, as long as large customers limit their actions to buying their own electricity supplies over the existing transmission and distribution grids. If, however, large customers by-pass the local distributors, either by constructing new lines to connect directly to the transmission grid or by investing in their own generating facilities, then the availability of power at reasonable rates to the distributors remaining retail customers may be adversely affected. As the larger customers drop off the local distribution system, there will be a smaller revenue base to recover fixed costs and dedicated plant. This will

leave the remaining utility customers forced to pay higher prices to the distributor. For this reason, some provision for recovery of this revenue loss may be justified on universal service grounds in this scenario.

Environmental Concerns

Regardless of which scenario advances, the proliferation of privately owned gas turbine cogeneration systems for industrial plants will escalate in the near-term future. Current federal and state environmental laws are sufficient to deal with the siting of, and emissions from, any new electric generation facilities.

The legislature should also consider in this scenario the environmental impact of new electric generators locating in Tennessee. Since TVA, a federal agency, owns all of the electric generation facilities in Tennessee, there has been no reason for the State to review requests for licenses to operate electric generation plants. Many states vest the oversight powers for all power plant siting with a state agency. The Tennessee legislature may want to consider whether such oversight is appropriate for Tennessee.

Taxes

Because the distributors and their large customers would be free to purchase wholesale power from sources other than TVA, the payments in lieu of taxes that TVA currently provides would be eliminated as described in Issue G. In addition, since many of the wholesale power providers would be out of state, it would be questionable whether Tennessee could tax these sales under current statutes. Finally, the distributors may be unable to fully recover their tax payments from their larger customers under this scenario since these bills will only reflect the delivery, instead of the sale, of electricity. As such, legislation protecting state and local revenues may be warranted under this scenario.

Local Rate Setting

For several years, TVA has regulated local rates through its contracts with the electric distributors. With electric distributors free to purchase power from new sources, TVA would no longer have control over local rate increases through their power contracts. The delegation of authority to set retail rates will remain with the local utility. Given the lack of statutory guidance over municipal and cooperative retail rate setting, the legislature may consider delegating to a state agency direct or appellate authority to consider matters involving retail rates. In addition, the distributors would need to design new rates for their large customers that would reflect only the delivery of electricity instead of the total sale.

Consumer Education

Deregulation of generation with retail choice for large users would not require a consumer education program. Large customers have incentives and resources to become well informed, and the marketing of these services could be handled by generators, various marketers and consultants.

Regulatory and Legal Issues

If municipal and cooperative electric companies are free to purchase power for resale from entities other than TVA, the supervision exercised by TVA through its contracts over rate increases will be gone. The delegation of the authority to set retail rates will remain with the local utility. The management of each municipal or cooperative electric company will have sole authority to set retail rates.

In addition, various other requirements that TVA places on its local distributors will be eliminated. For example, requirements over the electric distributors independent audits, accounting regulations, billing, and operational requirements are contained in the contract with

TVA. With the elimination or modification of these contracts, statewide electric regulatory oversight will be diminished. Given the lack of statutory guidance over municipal and cooperative rate setting and operations, the legislature may consider delegating to a state agency authority over these matters.

D. Competition in electric generation is federally mandated with retail choice available for all customers

Under this scenario, all end-users are free to choose their electric supplier in a competitive marketplace. The electric supplier then makes arrangements to deliver appropriate supplies to the distributor. End-users would be charged separately for electricity from the electric suppliers of their choice, and for delivery of electricity from the distributor.

Rates and Prices

While distributor charges may have to be increased for the added cost of billing and collecting for multiple suppliers of electricity, competition among generators and entry of new generation technology may cause power prices to fall. The net effect on prices to end-users is uncertain.

Stranded Costs

In a competitive generation marketplace, some of TVA's plant investment will no longer be useful. While this stranded cost is expected to be low for TVA, the exact amount is not presently known since it depends on the level of the ultimate wholesale power price. If not decided at the federal level, then the legislature may need to address how stranded cost is determined and passed on to the distributors. While the stranded costs, if any, for the distributors under this scenario would be minimal, the added complexities of managing multiple power supplies for their customers may cause an increase in costs to the distributors.

Reliability

A number of factors may cause open access retail markets to be less reliable. These factors include erratic weather, problems with generation and transmission, imbalances in supply and demand caused by the inability to store electricity, a barrage of suppliers vying for a share of

the market, and an increased number of transactions. In addition, responsibility for maintaining reliability must be shared by distribution and transmission providers. These providers will incur costs to maintain reliability and these costs will need to be recovered from customers.

Market Power

If retail competition is to work effectively for residential and small commercial customers, equal access to the transmission and distribution grids for buyers and sellers becomes even more crucial. Large customers possess strategic alternatives, such as building their own generation capacity or transmission line, that may force even a monopolist to sell to them at a near competitive price. Small buyers generally do not have similar economical alternatives, because 1) they are too small to efficiently and/or reliably utilize a generator on their own; and 2) the transactions costs of coordinating the construction and operation of a generation facility with sufficient numbers of other small buyers may be prohibitive. Thus, the availability of alternative power suppliers to residential and commercial end-users through open access to the transmission and/or distribution grids is critical.

In this case, open access to the distribution grid becomes an issue. For investor-owned distributors, such as Kingsport Power Company, open and equal access at nondiscriminatory rates would be guaranteed through regulation by the Tennessee Regulatory Authority. The other Tennessee distributors, however, are cooperatives or municipally-owned at this writing and not generally under the jurisdiction of the Authority. Without new state legislation, the responsibility for open access will fall to the governing boards of these otherwise unregulated distributors. It is not clear that such bodies will have sufficient incentives to allow outside suppliers fair access to their customers, or that they will seek instead to tie their customers to an affiliated power supplier in contravention of competition.

Universal Service

In this case, even small customers will have the responsibility of contracting for their own electricity supplies. In addition to the possibilities under Scenarios B and C, preserving universal service will require insuring open access to the distribution and transmission grids, so that small customers have as many alternative suppliers as possible, both generators and aggregator/marketers. If sufficient alternatives do not materialize, then the designation of a "supplier of last resort" at predetermined or regulated rates may be necessary to preserve universal service. This may or may not be the local distributor and/or its affiliated supplier/marketer, although such a role may be natural in return for stranded cost recovery mechanisms in the legislation implementing retail competition.

Environmental Concerns

Regardless of which scenario advances, the proliferation of privately owned gas turbine cogeneration systems for industrial plants will escalate in the near-term future. Current federal and state environmental laws are sufficient to deal with the siting of, and emissions from, any new electric generation facilities.

The legislature should also consider in this scenario the environmental impact of new electric generators locating in Tennessee. Since TVA, a federal agency, owns all of the electric generation in the State, there has been no reason for the State to review requests for licenses to operate electric generation plant in Tennessee. Many states vest the oversight powers for all power plant siting with a state agency. The Tennessee legislature may want to consider whether such oversight is appropriate for Tennessee.

Taxes

Because the distributors and their large customers would be free to purchase wholesale power from sources other than TVA, the payments in lieu of taxes that TVA currently provides would be eliminated as described in Issue G. Since many of the wholesale power providers would be out of state, it would be questionable whether Tennessee could tax these sales under current statutes. In addition, the distributors may be unable to fully recover their own tax payments from their customers under this scenario since these bills will only reflect the delivery, instead of the sale, of electricity. As such, Tennessee may need legislation protecting state and local revenues under this scenario.

Local Rate Setting

For several years, TVA has regulated local rates through its contracts with the electric distributors. With electric distributors free to purchase power from new sources, TVA would no longer have control over local rate increases through their power contracts. The delegation of authority to set retail rates will remain with the local utility. Given the lack of statutory guidance over municipal and cooperative retail rate setting, the legislature may consider delegating to a state agency direct or appellate authority to consider matters involving retail rates. In addition, the distributors would need to design new rates for their customers that would reflect only the delivery of electricity instead of the total sale.

Consumer Education

In order for consumers to make smart choices, they must first be educated about what they are being asked to choose. Federally mandated retail choice will require a comprehensive statewide consumer awareness program that ultimately educates consumers about the nature of electric deregulation, and more importantly, about the potential benefits and costs of choosing an electricity provider. Given the magnitude of change represented by a retail choice environment, it would be advantageous to employ a wide variety of advertising tools to successfully reach all who are likely to be affected. From "broad-reach" media vehicles such as television and print, to more narrowly aimed vehicles like radio and cable television, to community oriented outlets such as civic organizations or churches; all could be beneficial towards the goal of consumer education and should not be overlooked.

It will then become necessary to address other issues that will inevitably arise from a statewide consumer education program. One such issue deals with funding: How is a statewide consumer education effort to be funded? What is an adequate "fund" level to achieve the desired goal? In Pennsylvania and California, comprehensive consumer education programs cost $14 million and $83 million, respectively. Besides the total cost of the program, other questions remain. How are the funds appropriated? How is it determined when consumers are sufficiently educated? What are the financial expectations, if any, from participating electric providers and how are they set? Nonetheless, under federally mandated retail choice, a commitment to the goal of consumer education must be maintained in order to minimize, to the extent possible, consumer confusion, and to successfully transition consumers from the "old" method of purchasing electricity to the new environment of retail choice.

Regulatory and Legal Issues

Retail choice for all customers will require legislation to mandate open access to distribution grids and establish a method of determining distribution rates. In this retail choice environment, the supervision exercised by TVA through its contracts over rate increases will be eliminated.

In the absence of additional legislation, the delegation of the authority to set distribution rates in the State will remain with the local distributor without oversight. The potential policy concern would be that the local distributors, as bottleneck service providers, could abuse their market power by setting unjust and unreasonable rates.

In addition, various other requirements that TVA places on its local distributors will be eliminated. For example, requirements over the electric distributors independent audits, accounting regulations, billing, and operational requirements are contained in the contract with TVA. With the elimination or modification of these contracts, statewide electric regulatory oversight will be diminished. Given the lack of statutory guidance over municipal and cooperative rate setting and operations, the legislature may consider delegating to a state agency authority over these matters.

SECTION VII – CONCLUSIONS AND RECOMMENDATIONS

It appears likely that some type of regulatory reform will eventually be passed by Congress for electric generating utilities. The driving forces for reform are the availability of a new generation of gas turbines and the increase in connections among transmission systems. Technologically improved gas turbines can now generate electricity more cheaply on a smaller scale than the embedded systems which utilities already have in place. The connections among transmission systems have made the transportation of electric supplies over longer distances feasible.

The response to these changes will likely be the deregulation of the electric generation to allow a market for power and entry of new generation plants. As more large commercial and industrial customers convert to non-utility generation, the incumbent electric generation utility may be left with the same embedded costs to recover through a smaller customer base--ultimately driving rates higher for the remaining customers. These existing generation utility embedded costs will then need to be recovered through an unavoidable stranded cost surcharge to the distribution utilities.

Although TVA's status as a federal entity gives the U.S. government the first move in restructuring the electric industry in Tennessee, the legislature should begin a reassessment of its policies toward electric utilities in preparation for federal action. Even in restructuring's mildest form, revisions to the electric industry tax policies, plant siting requirements, and rate setting mechanisms will need to be considered. Specifically, the legislature should consider an end-user electric and gas delivery tax to replace the payments in lieu of taxes in order to protect these revenues. In addition, the legislature should consider establishing registration or licensing

requirements for new electric generation plants. While other states exercise jurisdiction over the location of new power plants, Tennessee's relationship with TVA has not prompted such action up to now. Further, as TVA's contractual oversight of distributor rate setting disappears, the legislature should consider setting standards for distributors to follow in setting rates. Additional State oversight or a new appellate process may also be appropriate.

A movement toward full retail choice for all electric consumers will require extensive State action. The Tennessee Code is now silent on such retail choice issues as open access to the distribution grids, methods for establishing distribution rates, reliability and supplier-of-last-resort responsibilities, the recovery of any stranded costs or lost revenues, and consumer education. New legislation to implement retail choice must address these complex issues. Nevertheless, at this point in time, it is not clear that full retail choice is in the best interest of the people of Tennessee.

Federal actions to mandate electric utility restructuring may also affect electric service reliability in Tennessee and across the nation. Proponents of a rapid movement to retail competition for electricity argue that competition will prompt suppliers to develop new and innovative products and services to enhance reliability. Given the proper incentives and responsibilities for both suppliers and consumers, service quality and reliability will become important marketing tools for electricity suppliers. Nevertheless, there are a number of uncertainties associated with restructuring which could jeopardize reliability if competitive policies are ill conceived or poorly implemented. In addition, the establishment of the necessary institutions and procedures, such as ISOs and information systems, may be costly. These reliability related issues and uncertainties must be considered and addressed in any federal legislation to implement competition in electricity markets.

Finally, we suggest the following responses to the six questions that the Special Joint Committee is charged to study.[47]

1. **"What effect [does] Tennessee's status as a state that is provided power almost exclusively from the Tennessee Valley Authority ...have on the deregulation process?"**

   Changes in the treatment of the Tennessee Valley Authority essentially determine whether deregulation and restructuring of the electric industry will occur in Tennessee. While the General Assembly has jurisdiction over retail competition, retail rates, and the distribution function, changes at these levels can have little effect unless the status of TVA is altered at the federal level.

2. **"What services and other functions of the electric utility industry can best achieve their goals by being subject to competition, if any, taking into account factors such as reliability, price, profit, and rates?"**

   The generation of electricity is moving toward competition in many states and is likely to spread nationwide, possibly under the mandate of federal legislation. Changes in the technology of generation and in interconnectivity of the transmission grid have greatly reduced the monopoly elements in generation that justified its regulation for many years. These factors are also likely to reduce the average retail price of electric power in the long run under competition. Nevertheless, the Federal Energy Regulatory Commission has asserted jurisdiction over the generation utilities, pre-empting the jurisdiction of the states and leaving the regulatory treatment of the generation markets largely in federal hands.

In addition, certain ancillary functions of the electric distribution utilities could be opened up to competition today. For example, meter reading, billing, and customer call centers are utility functions that could be performed in a competitive environment.

3. **"What services and other functions of the electric utility industry can best achieve their goals through regulation or a combination of regulation and competition, if any?"**

The transmission and distribution functions retain monopoly characteristics that urge regulation, in some form, to prevent the exercise of market power. The Federal Energy Regulatory Commission has asserted jurisdiction over the transmission function, pre-empting the jurisdiction of the states. Distribution, however, remains under state jurisdiction. Here, a combination of regulation and competition may best serve consumers. Competition in generation will likely force some competition for large customers at the retail level, while retail competition may or may not serve small customers as well as a regulated bundled service from their local distribution company. Even if retail competition is implemented for all customers, the charges for transporting power supplies to end-users over the local distributors' wires will require regulation in some form.

4. **"Whether the electric utility industry's provision of telephone and telegraph services can enhance competition in those areas and aid the deregulation of the electric industry?"**

This question is moot following passage of Public Chapters 531 and 520 in 1997 and the subsequent applications for certification of electric utilities as Competing

Telecommunications Services Providers filed with the Tennessee Regulatory Authority.

5. **"With respect to those services and other functions that should be subjected to competition, [what are] the ways and means of monitoring such services and functions to ensure that there is, in fact, competition and that competition is achieving its goals?"**

An independent body, such as the Tennessee Regulatory Authority or other suitable entity, should be charged with monitoring the price and availability of wholesale power if and when competition in the generation markets is implemented in Tennessee. Periodic reports to the General Assembly also should address the reliability, market power, and universal service issues in the competitive environment.

With respect to those ancillary services of the distribution utility that could be opened to competition, such as meter reading, these items could be contracted with different providers on a competitive basis. The distribution utility would then monitor these contractors and could later conduct the functions themselves if performance is not adequate. Therefore, these particular functions would require no monitoring.

6. **"With respect to those services and functions that should be regulated, what form [should] such regulation... take and the ways and means of determining whether or not such regulation is achieving its goals?"**

There are several options available here. First, the rate setting authority could reside with the local governing boards. Second, an appellate process similar to

that provided for customers of utility districts in TCA 7-82-102(b) could be created. Finally, an independent body, such as the Tennessee Regulatory Authority or other suitable entity, could be charged with monitoring the price, availability, and reliability of retail power. These options become available when restructuring has caused TVA's oversight over the electric distribution utilities to cease. The monitoring of the effectiveness for each of the options presented would then be carried out through the normal local political process and/or state sunset review process as appropriate.

SECTION VIII – APPENDICES

Appendix 1
TVA Cooperative Distribution Companies

Customer	Annual kWh Usage
Appalachian Electric Cooperative	717,155,000
Caney Fork Electric Cooperative	507,541,000
Chickasaw Electric Cooperative	295,703,000
Cumberland Electric Membership Cooperative	1,557,196,000
Duck River Electric Membership Cooperative	1,115,600,000
Forked Deer Electric Cooperative	184,766,000
Fort Loudoun Electric Cooperative	392,342,000
Gibson Electric Membership Cooperative	687,812,000
Hickman-Fulton Counties RECC	117,694,000
Holston Electric Cooperative	643,777,000
Meriwether Lewis Electric Cooperative	649,253,000
Middle TN Electric Membership Cooperative	2,941,564,000
Mountian Electric Cooperative	500,472,000
Pickwick Electric Cooperative	363,885,000
Plateau Electric Cooperative	247,175,000
Powell Valley Electric Cooperative	421,450,000
Sequatchie Valley Electric Cooperative	662,333,000
S. W. Tennessee Electric Membership Cooperative	802,044,000
Tennessee Valley Electric Cooperative	314,583,000
Tippah EPA	276,903,000
Tri-County Electric Membership Cooperative	947,160,000
Tri-State Electric Membership Cooperative	191,889,000
Upper Cumberland Electric Membership Cooperative	779,315,000
Volunteer Electric Cooperative	1,560,664,000
Total	**16,878,276,000**

Source: Tennessee Valley Authority, Summary of Financial Statements, Sales Statistics, and Rates, Fiscal Year Ended June 30, 1997.

Appendix 2
TVA Municipal Distribution Companies

Customer	Annual kWh Usage	Customer	Annual kWh Usage
Alcoa	447,424,000	Lenoir City	1,094,628,000
Athens	556,513,000	Lewisburg	281,886,000
Benton County	218,065,000	Lexington	407,464,000
Bolivar	216,234,000	Loudon	317,765,000
Bristol	841,848,000	Maryville	583,247,000
Brownsville	196,522,000	McMinnville	237,184,000
Caroll County	383,096,000	Memphis	12,327,203,000
Chattanooga	5,500,859,000	Milan	236,031,000
Clarksville	941,241,000	Morristown	788,970,000
Cleveland	927,694,000	Mt. Pleasant	93,034,000
Clinton	649,838,000	Murfreesboro	979,922,000
Columbia	507,775,000	Nashville	10,854,932,000
Cookeville	494,285,000	Newbern	101,454,000
Covington	242,356,000	Newport	439,373,000
Dayton	199,533,000	Oak Ridge	474,929,000
Dickson	662,814,000	Paris	440,682,000
Dyersburg	637,829,000	Pulaski	424,169,000
Elizabethton	496,832,000	Ripley	253,778,000
Erwin	219,767,000	Rockwood	304,182,000
Etowah	145,668,000	Sevierville	999,582,000
Fayetteville	356,518,000	Shelbyville	340,915,000
Gallatin	523,823,000	Smithville	94,839,000
Greeneville	952,165,000	Somerville	34,165,000
Harriman	249,709,000	Sparta	94,251,000
Humboldt	231,637,000	Springfield	221,698,000
Jackson	1,317,007,000	Sweetwater	192,011,000
Jellico	73,559,000	Trenton	89,475,000
Johnson City	1,656,861,000	Tullahoma	266,606,000
Knoxville	4,853,119,000	Union City	357,231,000
Lafollette	351,523,000	Weakley County	473,349,000
Lawrenceburg	474,301,000	Winchester	144,257,000
Lebanon	362,388,000	**Total**	**59,838,015,000**

Source: Tennessee Valley Authority, Summary of Financial Statements, Sales Statistics, and Rates, Fiscal Year Ended June 30, 1997.

Appendix 3
TVA Direct Served Customers

Customer
Industrial
A. E. Staley Manufacturing. Company
Alumax Engineered Metal Processes, Inc.
Aluminum Co. of America (Alcoa)
AmeriSteel Corp.
Birmingham Steel Corp.
Bowater Inc.
Bridgestone/Firestone Inc.
E. I. du Pont De Nemours Co
Inland Paperboard and Packaging Inc.
Intertrade Holdings Inc. (formerly BIT)
Kimberly-Clark Corp.
Lenzing Fibers Corp.
Occidental Chemical Corp.
Olin Corp.
Saturn Corp.
Savage Zinc Inc.
Skyline Coal Co.
Solutia Inc.
Tenneco Packaging-Counce Mill
Texas Eastern Transmission Corp.
UCAR Carbon Company Inc. (Clarksville TN)
UCAR Carbon Company Inc. (Columbia TN)
Federal
Department of Energy (DOE)
Department of the Air Force - Arnold Engineering Development Center
Department of the Army - Volunteer Army Ammunition Plant
Department of the Navy - Memphis Naval Air Suport Activities

Source: Tennessee Valley Authority

Appendix 4
State Utility Commissions with Rate Authority over <u>Municipal</u> Electric Systems

1. Alaska Public Utilities Commission
2. Florida Public Service Commission
3. Indiana Utility Regulatory Commission
4. Kansas State Corporation Commission
5. Louisiana Public Service Commission
6. Maine Public Utilities Commission
7. Maryland Public Service Commission
8. Massachusetts Department of Public Utilities
9. Minnesota Public Utilities Commission
10. Montana Public Service Commission
11. New Hampshire Public Utilities Commission
12. New Jersey Board of Public Utilities
13. New Mexico Public Utility Commission
14. New York Public Service Commission
15. Pennsylvania Public Utility Commission
16. Rhode Island Public Utilities Commission
17. Texas Public Utility Commission
18. Vermont Public Service Board
19. Virginia State Corporation Commission
20. West Virginia Public Service Commission
21. Wisconsin Public Service Commission
22. Wyoming Public Service Commission

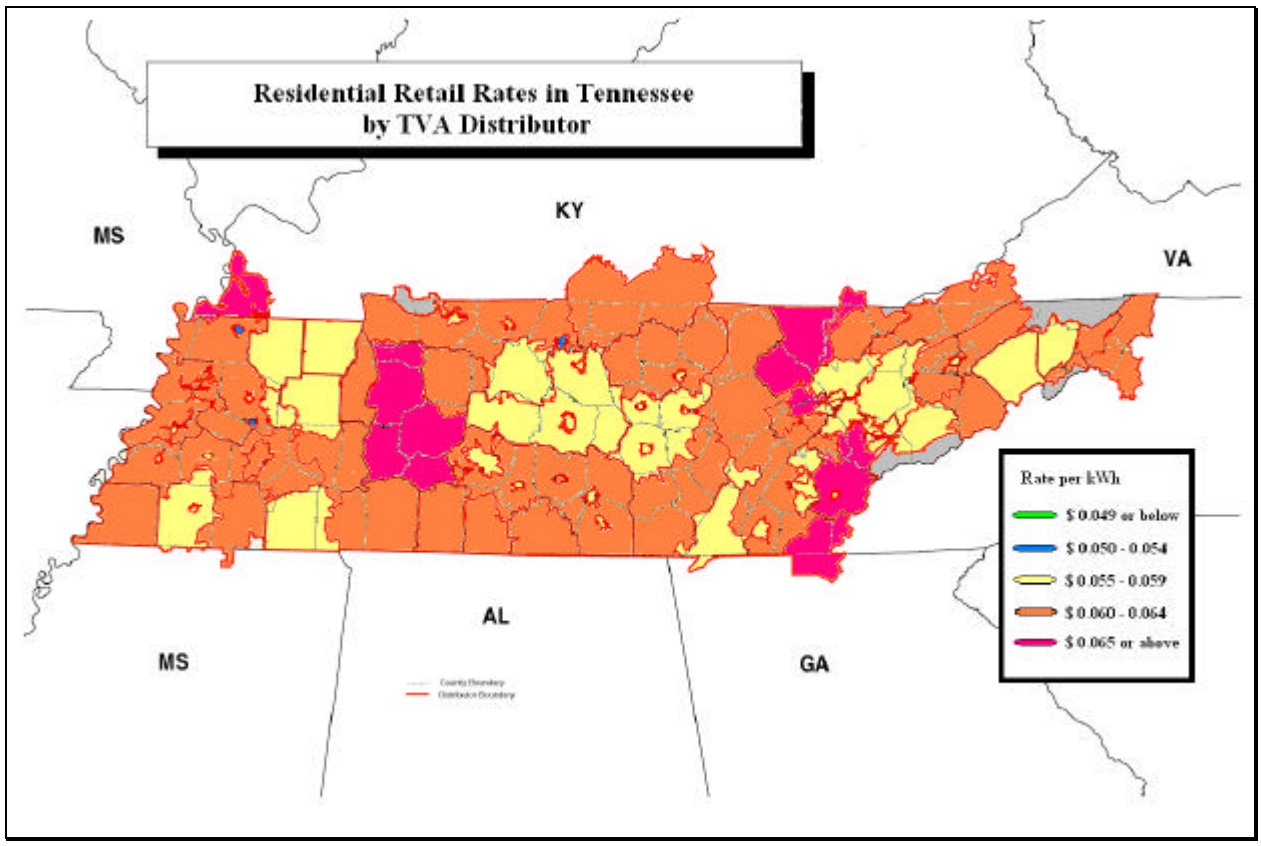
Source: Utility Regulatory Policy in the United States and Canada -- Compilation 1994-1995, National Association of Regulatory Utility Commissioners

Appendix 5
State Utility Commissions with Rate Authority over Cooperative Electric Systems

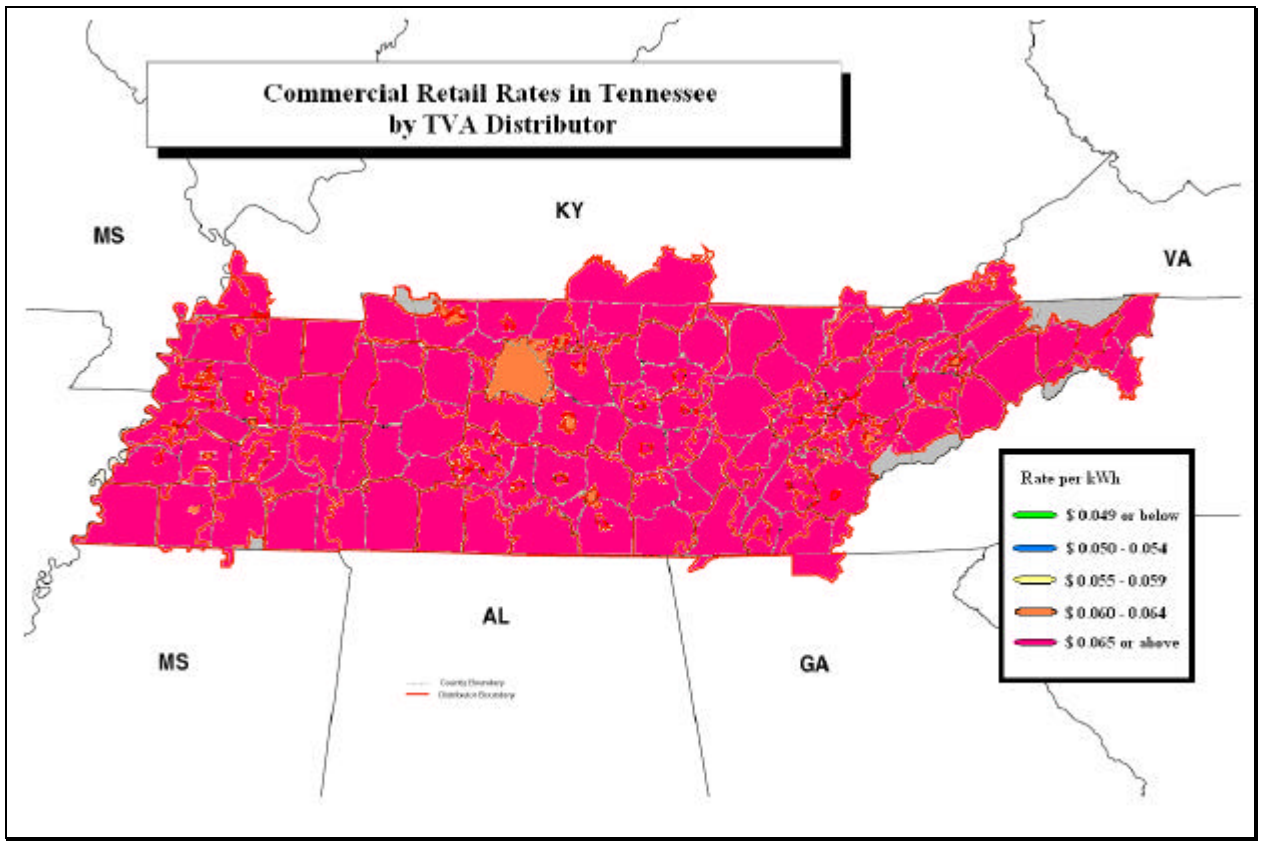
1 Alaska Public Utilities Commission
2 Arizona Corporation Commission
3 Arkansas Public Service Commission
4 Colorado Public Utilities Commission
5 Delaware Public Service Commission
6 Florida Public Service Commission
7 Indiana Utility Rate Commission
8 Kansas State Corporation Commission
9 Kentucky Public Service Commission
10 Louisiana Public Service Commission
11 Maine Public Utilities Commission
12 Maryland Public Service Commission
13 Michigan Public Service Commission
14 Minnesota Public Utilities Commission
15 Nevada Public Service Commission
16 New Hampshire Public Utility Commission
17 Oklahoma Corporation Commission
18 Rhode Island Public Utilities Commission
19 Texas Public Utility Commission
20 Utah Public Service Commission
21 Vermont Public Service Board
22 Virginia State Corporation Commission
23 West Virginia Public Service Commission
24 Wyoming Public Service Commission

Source: Utility Regulatory Policy in the United States and Canada -- Compilation 1994-1995, National Association of Regulatory Utility Commissioners

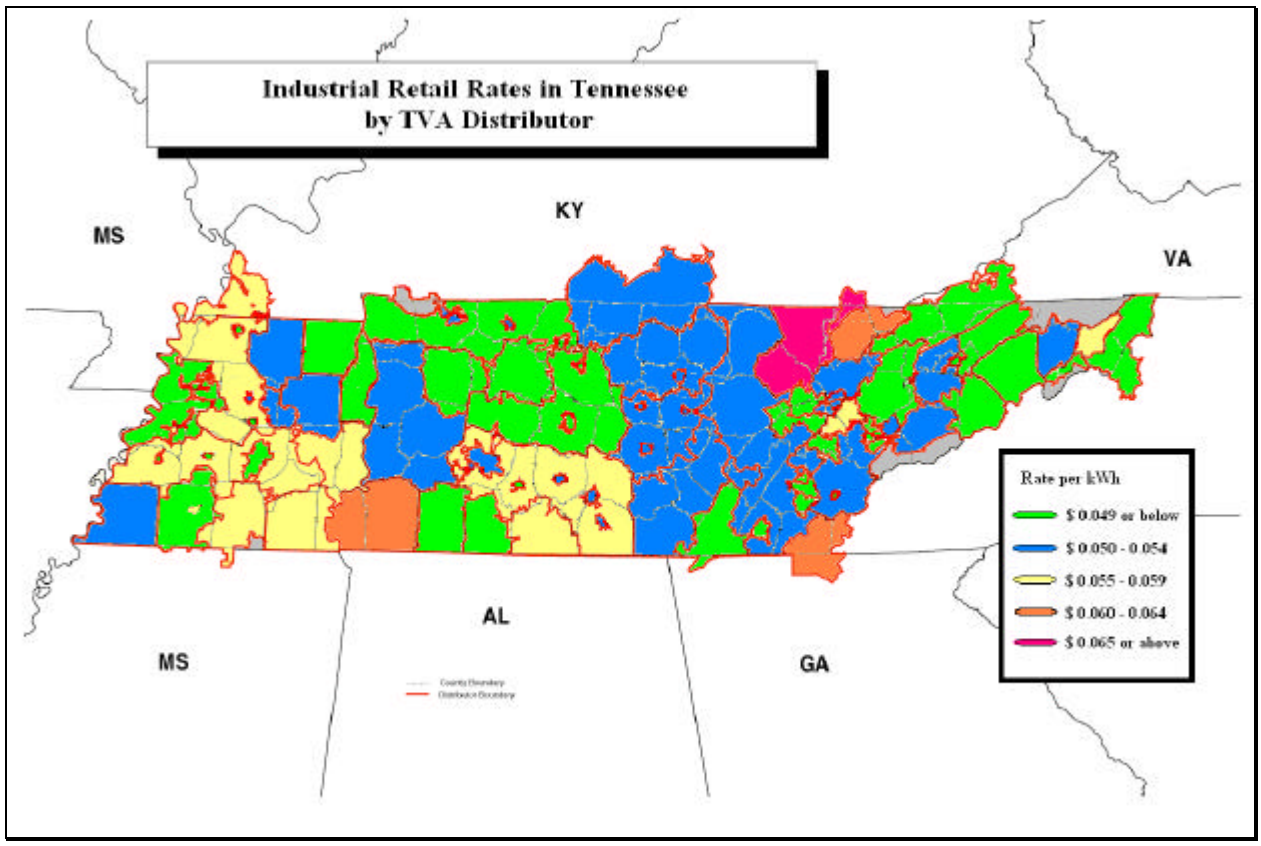
Appendix 6
<u>Residential</u> Retail Rates in Tennessee



Appendix 7
<u>Commercial</u> Retail Rates in Tennessee



Appendix 8
<u>Industrial</u> Retail Rates in Tennessee



Appendix 9
Physics of an Electric System

Increased demand for transmission services are expected due to actions taken by state commissions' and FERC's open access orders to promote competition in the electric industry. The development of a more competitive environment in Tennessee, and throughout the Southeast, carries the possibility of stressing transmission capacity as more participants use the transmission network to deliver or receive purchased power. When transmission capacity becomes stressed, an electric utility must offer to increase its transmission capacity, as necessary, to provide transmission services pursuant to the Energy Policy Act (EPAct) of 1992. However, approval to build new transmission facilities is becoming more difficult to obtain because of concerns over the environment, the potential health effects of electromagnetic fields (EMF), and the decline of property values along transmission routes. As a result, possible alternatives to building new lines, for example upgrading the transmission system, must be examined to maximize the capability of existing transmission facilities. Transmission upgrades can be a feasible option because the associated cost and lead times are typically less than for new construction. To examine viable alternatives, it is important to understand the physics of an electric system, particularly, the thermal, voltage, and operating constraints on a system's capability to transmit power from one area to another. "Additional power can be transmitted reliably if there is sufficient available transfer capability on all lines in the system over which the power would flow to accommodate the increase and certain contingencies or failures that could occur on the system."[48] A discussion of these constraints is presented in this section along with a brief description of the control system used for the TVA control area.

Thermal and Electrical Current Constraints

Of the three constraints that limit the transfer capability of the transmission system, thermal limitations are the most common. Heat is produced along transmission lines and equipment due to the resistance of the flow of electrons through it. Temperatures occurring in the line and equipment depend on the rate of flow of electrons (i.e., current), and on ambient weather conditions that affect the dissipation of the heat into the air. However, thermal ratings for transmission lines are normally expressed in terms of current flows rather than actual temperatures.

Overheating of transmission lines can lead to two problems: (1) loss of line strength which can reduce its expected life, and (2) expansion and permanent sagging of line spans between supporting towers which can cause ground clearance violation associated with safety requirements. Thermally induced sagging was responsible for the major outages that occurred on the western grid during July and August of 1996. These are eventual results if overheating occurs extensively, Emergency ratings of transmission lines refer to higher levels of current flow that can be supported for limited time periods. A "normal" thermal rating is the current flow level the line can support indefinitely. Thermal constraints also limit underground cables and power transformers. Operation of these facilities at excessive temperatures can cause damage to their insulation resulting in shorter service lives.

Voltage Constraints

Voltage (pressure-like quantity) is a measure of the electromotive force necessary to maintain a flow of electricity on a transmission line. Fluctuations of voltage can result from changes in demand and failures on the grid. Maximum voltage levels are set by the design of the transmission line. If the maximum level is exceeded, short circuits, noise, and radio interference

can occur. Also, substation equipment and customer facilities can be damaged. Power requirements of the customers also constrain minimum voltage. Voltage levels below minimum limits cause inadequate operation of customer's equipment and possible damage to electric motors.

A decrease in voltage on a transmission line, known as a voltage drop, occurs from the sending end to the receiving end. This occurrence is almost directly proportional to reactive power flows and line reactance in an alternating current (AC) line. Reactive power is a characteristic of AC power resulting from a time difference between voltage and current variations that depend on the power dispatch and the power requirements of the system. Reactance is a characteristic of the design configuration and length of the line. The installation of capacitors and inductive reactors on lines help to control the amount of voltage drop. In essence, voltage and current levels determine the power that can be delivered to customers.[49]

System Operating Constraints

Operating constraints stem from security and reliability concerns related to maintaining power flows. Power flow patterns redistribute when demand and generation patterns change, or when the system grid is altered due to a circuit being switched on or put out of service. When power is transmitted from one utility, or control area[50], to another, the resulting power flows along all paths joining the two areas, regardless of ownership of the lines. The amount of power transmitted on each path of the system depends on the impedance of the various paths. Impedance is the opposition to the power flow on an AC circuit. Moreover, impedance depends on the length of the line and design details for the line. A path of low impedance attracts a greater part of the total transfer than a path of high impedance.

In a wholesale power transaction, a pro forma "contract path" of transmission lines or systems is designated through which the power is expected to flow. However, the actual power flows do not necessarily follow the contract path but may flow through parallel paths in other transmission systems depending on the loading conditions at that time. These are known as "parallel path flows." "Loop flows" are a result of interconnected transmission systems whereby power flows can inadvertently travel into the other systems' networks and return. This reiterates the point that power flow is controlled by physics, not contracts. Currently, it is not a requirement of law that contracts reflect the actual path. Parallel path flows and loop flows can limit the transfer capability of other systems that are not a part of the scheduled contract path.[51] The illustration below demonstrates the possible results of a 100 MW transaction between Utility "A and Utility "D."

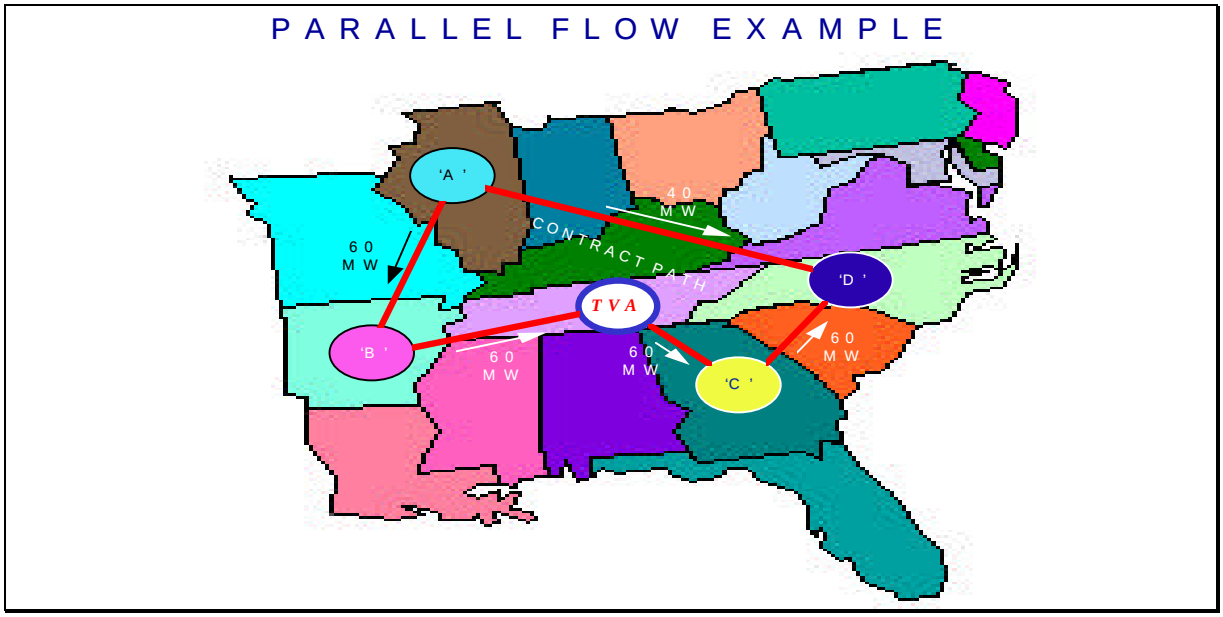


Figure 9 – Parallel Flow Example

The "contract path" in this example is the transmission line interconnecting the utilities "A" and "D." As illustrated, a portion of the load flows through other paths. In this example a majority of the load actually flows through paths other than the "contract path." The actual path of current flow is dependent on characteristics of each system, not written contracts. This emphasizes the importance of coordination among interconnected utilities.

Preventive operation for system security also represents constraints on system operation. The bulk power system is designed and operated to avoid service interruptions, referred to as "contingencies," due to component outages such as loss of a generation unit, loss of a transmission line, or a failure of a single component of the system. The adoption of NERC guidelines has increased security of interconnected systems throughout its jurisdiction by requiring systems to operate in such a manner that they can withstand the single largest contingency possible and, when practical, withstand multiple contingencies. The preventive operating

guidelines provided by the NERC include running sufficient generation capability to provide operating reserves in excess of demand and limiting power transfers on the transmission system. This allows the system to operate so that each element remains below normal thermal constraints under normal conditions and under emergency limits during contingencies. Proper levels of reserve capacity accommodate contingencies.

One of the advantages of an interconnected system is reserve sharing. Utility management must have access to additional power facilities (reserves) that can be put into service either immediately (spinning reserves) or after a short period of preparation (supplemental reserves). This reserve capacity is needed in case of contingencies or customer demand in excess of plant capability. Reserves may be obtained from spare generating units or through interconnection. If a contingency occurs in one company, power can be supplied temporarily by the other companies. Thus, an interconnected system of reliable suppliers enhances overall reliability and decreases the reserve levels needed by independent utilities. This assumes that each supplier in an interconnected system provides proportionate reserve margins to accommodate "the vagaries of demand and for unexpected breakdowns of generators." The proper level of generating reserves (i.e., reserve margin) depends on system characteristics, such as types of generators, load growth, and demand conditions. Moreover, reserves can be offset by interruptible arrangements. Some utilities make large sales to interruptible customers whose service the utility can turn off at will.[52] Normally, the desired reserve margin is set by a loss of load probability (LOLP) analysis designed to assure that blackouts and brownouts will be limited.[53]

System operating constraints also involve system stability. Problems associated with system stability are typically grouped into two types: (1)-maintaining synchronization among system generators and (2) preventing voltage collapse. In the United States, interconnected

systems are considered synchronous when all generators rotate in unison at a speed that produces a consistent frequency of 60 hertz (cycles per second). Disturbances (i.e., faults) and their removal cause oscillations in the speed at which the generator rotates and in the frequency of the power flows in the system. Unless natural conditions or control systems damp out the oscillations, the system is unstable. This occurrence is known as transient instability and can lead to collapse of the system. Along these lines are other types of instability, such as steady state and dynamic.[54] These conditions can lead to large voltage and frequency fluctuations. To avoid unstable conditions, power transfers between areas are limited to levels determined by contingency studies.

Finally, voltage collapse can occur from a chain of events that stem from voltage instability. This occurs if transmission lines are not adequately designed to handle large amounts of reactive power, resulting in severe voltage drops at the receiving end. This causes the consuming entities to draw increasing currents that create additional reactive power flows and voltage losses in the system. If the process continues, voltages can collapse further and may require users to be disconnected in order to prevent serious damage.[55]

TVA Control Area

Constraints on the transfer capability of a power pool require utilities to control their interconnected operations by monitoring tie line flows and accounting for capacity and energy interchanges (i.e., net sum of tie line flows) between non-associated utilities via real time metering and telemetry. This is accomplished on the TVA electric system through the use of Automatic Generation Control (AGC) and the concept of Area Control Error (ACE). AGC is a control system that matches the level of generation on the TVA electric system to the real time load obligations of the system while maintaining system frequency near 60 Hz. As the amount of

electricity used by the customers increases and decreases throughout the day, the output of the power plants is automatically raised or lowered via AGC to match the load. AGC adjusts the level of generation every few minutes. ACE is the difference between the amount of power scheduled to flow into or out of the system and actual system interchange experienced plus a number based on deviation from 60 Hz, which represents contribution to frequency regulation on the Eastern Interconnection. AGC always acts to drive ACE toward zero, which implies system balance and frequency stability in accordance with NERC/SERC guidelines for reliable system operation. This same methodology is utilized by Southern Company and other utilities interconnecting with TVA.[56]

Conclusion

For the bulk power system to operate reliably, it must be designed and operated based on the following principles:

- The total generation at any moment must be kept equal to total electricity consumption and losses on the system including transmission and distribution.
- The electricity is allowed to flow through the transmission system in accordance with physical laws and cannot be directed to flow through specific lines.
- The system must be designed with sufficient reserve capacity in generation and transmission to allow for uninterrupted service when contingencies occur.[57]

The three constraints, thermal, voltage and operating, described above limit a system's ability to transfer power along a transmission system. Upgrade options are available but must be carefully considered with other alternatives to control the transfer of bulk power. Changing the generation pattern provides limited control over actual power flow. Other methods of control may include upgrade remedies, such as rebuilding lines, refining methods to determine thermal

ratings of equipment for different conditions, installing phase shifters and building high voltage direct (HVDC) lines. Use of HVDC lines may not be economically feasible. Some technologies have been developed to help mitigate preventive operating constraints. For example, the concept of a Flexible AC Transmission System (FACTS) uses new power-electronic switches and other devices to provide faster and more refined control of equipment to change the way power flows redistribute under normal conditions or during contingencies. This can allow for increased transfer capability in transmission and distribution systems. Other technologies are being developed to move toward "corrective," rather than "preventive" methods of operation.[58] As increased competition continues in the electric power industry, the transfer capability of the transmission system will be a major concern for future operators.

Appendix 10
Taxes and Tax Equivalents of Tennessee Distribution Utilities

Company	Tax Payments	Customer	Annual kWh Usage
Alcoa	$565,075	Memphis	$22,264,255
Athens	558,840	Milan	220,276
Benton County	369,724	Morristown	765,320
Bolivar	387,332	Mt. Pleasant	125,764
Bristol	1,019,179	Murfreesboro	1,318,275
Brownsville	202,806	Nashville	12,922,743
Caroll County	447,145	Newbern	103,188
Chattanooga	7,837,413	Newport	711,041
Clarksville	1,109,993	Oak Ridge	910,464
Cleveland	1,069,618	Paris	528,943
Clinton	1,070,957	Pulaski	719,491
Columbia	654,820	Ripley	244,037
Cookeville	536,186	Rockwood	482,847
Covington	242,464	Sevierville	1,084,900
Dayton	255,211	Shelbyville	390,940
Dickson	620,701	Smithville	42,526
Dyersburg	820,432	Somerville	9,965
Elizabethton	856,142	Sparta	74,270
Erwin	249,974	Springfield	267,541
Etowah	156,488	Sweetwater	241,276
Fayetteville	768,182	Trenton	111,587
Gallatin	332,685	Tullahoma	372,195
Greeneville	982,098	Union City	272,610
Harriman	267,375	Weakley County	586,434
Humboldt	185,015	Winchester	208,215
Jackson	1,673,030		
Jellico	185,120	**Municipal Total**	**$83,424,836**
Johnson City	1,843,769		
Knoxville	7,681,787		
Lafollette	567,217		
Lawrenceburg	644,173		
Lebanon	379,957		
Lenoir City	1,625,562		
Lewisburg	314,993		
Lexington	566,836		
Loudon	382,817		
Maryville	685,803		
McMinnville	328,814		

Source: TVA, Summary of Financial Statements, Sales Statistics, and Rates, Fiscal Year Ended June 30, 1997.

Appendix 10
Taxes and Tax Equivalents of Tennessee Distribution Utilities

Company	Tax Payments
Electric Cooperatives	
Appalachian Electric Cooperative	$545,396
Caney Fork Electric Cooperative	440,974
Chickasaw Electric Cooperative	157,733
Cumberland Electric Membership Cooperative	2,097,509
Duck River Electric Membership Cooperative	1,425,273
Forked Deer Electric Cooperative	172,489
Fort Loudoun Electric Cooperative	359,475
Gibson Electric Membership Cooperative	754,714
Hickman-Fulton Counties RECC	290,634
Holston Electric Cooperative	609,810
Meriwether Lewis Electric Cooperative	543,834
Middle TN Electric Membership Cooperative	2,483,703
Mountian Electric Cooperative	1,002,422
Pickwick Electric Cooperative	416,658
Plateau Electric Cooperative	543,718
Powell Valley Electric Cooperative	611,000
Sequatchie Valley Electric Cooperative	739,164
S. W. Tennessee Electric Membership Cooperative	1,014,860
Tennessee Valley Electric Cooperative	381,438
Tippah EPA	199,756
Tri-County Electric Membership Cooperative	1,643,467
Tri-State Electric Membership Cooperative	330,052
Upper Cumberland Electric Membership Cooperative	872,012
Volunteer Electric Cooperative	1,799,604
Cooperative Total	**$19,435,695**
Private Systems	
Kingsport Power Company	**$3,936,816**
Grand Total	**$106,797,347**

Source: TVA, Summary of Financial Statements, Sales Statistics, and Rates, Fiscal Year Ended June 30, 1997 and Tennessee Regulatory Authority Monthly Financial Reports.

Appendix 11
Low Cost Electricity States Initiative

A National Voice

Issue

- As a restructured electric industry becomes a reality in many parts of the nation, little attention has been given to the concerns of low cost states. Making up more than half of the country, these low cost states are being pressured into opening their electric industries to competition with little or no consideration of the effects on native retail customers. The Low Cost Electricity States Initiative believes it is time to make Congress aware of our concerns.

Background

- In 1996, the average retail price of electricity for all users was 6.87 cents per kilowatt hour. Two-thirds of the country pays electric rates below the national average, and 20 states pay below 6 cents per kilowatt hour for electricity. Only 10 states pay over 9 cents per kilowatt hour for retail electric service.

- The average retail price of electricity in the fifteen states that have restructured to date is 8.62 cents per kilowatt hour, or more than 25% higher than the national average.

- Montana, Nevada, Oklahoma, and Virginia are the only low cost states that have chosen to restructure their electric industry.

- Supporters of electric restructuring tend to be from high-cost states, and are often industrial customers.

- In some regions of the country, such as the Northwest and Southeast, there is very little momentum to restructure the retail electric industry.

- A host of studies and research papers introduced into the restructuring debate have failed to reach a clear consensus as to the benefits of retail restructuring, particularly for low cost states.

- Legislation introduced in Congress has, in large part, been modeled after restructuring plans and experimental programs adopted in high-cost states.

Low Cost States Initiative Position

- The Low Cost Electricity States Initiative believes that as the restructuring debate continues, the concerns of low cost states must be considered. Specifically, Congress must consider the benefits low cost electricity states currently receive from low cost power and ways to preserve such benefits.

- Congress should allow state governments and regulators to choose if, when, and how to restructure the retail electric industry. States are in the best position to evaluate the effects of restructuring on their citizens and to address the myriad of issues associated with restructuring.

Low Rates

Issue

- The Low Cost Electricity States Initiative is made up of utility commissions from 23 states, with an average retail electricity price of 5.52 cents per kilowatt hour, more than one cent below the national average. Under the current movement toward retail electric competition, the price advantage to customers in low cost states could be taken away if it becomes attractive for low cost utilities to sell their electricity to high cost states for higher profits.

Background

- The Low Cost Electricity States Initiative is composed of 23 state commissions throughout the nation. They include: Alabama, Florida, Georgia, Idaho, Indiana, Kentucky, Louisiana, Minnesota, Missouri, Mississippi, Montana, North Carolina, North Dakota, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin.

- These 23 states experience some of the lowest electricity prices in the nation. In fact, the average per kilowatt hour charge in these states is 24% lower than the national average.

- Low electricity rates are an advantage to these states in a variety of ways. Low rates provide lower costs for producers of goods, greater economic development incentives, and inexpensive heating and cooling for homes. All of these factors contribute to a lower, and more desirable, cost of living.

- Proponents of retail electric competition argue that regional prices of electricity should be similar. Therefore, competitive markets across state borders "should" be allowed. Only a handful of studies have suggested that prices will fall for all users in a competitive environment.

- Traditional logic may suggest otherwise, as higher cost states find it attractive to purchase the electricity of low-cost states, effectively raising prices for any native low-cost electricity. In fact, a research paper that supports restructuring says that "regions of lowest price…may experience slightly higher prices[1]." The Energy Information Administration agreed in a 1997 paper on prices in a restructured market that predicted competitive prices in the Northwest and parts of the Midwest would be higher than average (or regulated) prices[2]. Finally, a paper from the Oak Ridge National Laboratory suggests that retail competition will cause electricity prices in the Northwest to rise as producers of electricity sell their inexpensive power into nearby high-cost electricity markets[3].

Low Cost States Initiative Position

- Whatever the outcome of the debate on electric restructuring, all states, including the low cost states in this Initiative, should be able to choose their own destiny in restructuring, and not be subject to the changes in other states or a mandatory date-certain restructuring by Congress.

Rural Electricity Rates

Issue

- Rural residents benefit from low-cost electricity as much, and perhaps to an even greater degree, than urban residents do. Under retail electric competition, rural residents could be unnecessarily worse off relative to other customers.

Background

- Rural homes were among the last to receive electric power. Thanks in large part to FDR's New Deal, even the most remote homes were made part of the larger electric system for the first time. This allowed the standard of living among rural residents to increase at a dramatic rate.

- Many rural residents have been served by nearby sources of inexpensive electricity such as coal and hydro.

- A competitive electric industry will likely mean that utilities will be more interested in their 'bottom line' and not necessarily the good of their native customers.

- Deregulation in similar industries such as rail and airlines has shown that choices for rural customers tend to go down, while prices tend to go up.

- Research has considered the effects of competition on rural customers. A study by the University of Kentucky's College of Agriculture predicts rural residents in Kentucky will be worse off under a restructured electric industry[4].

Low Cost States Initiative Position

- Any attempt to restructure the nation's electric industry must provide benefits for all customers, including rural residents.

- Congress must consider the effects of restructuring legislation on both the urban and rural customer. Congress should not enact legislation that may unintentionally, yet unfairly, discriminate against rural residential electric customers.

Stranded Costs

Issue

- Many states that are switching to a competitive retail electric market allow recovery of a utility's "stranded costs." The customers, no matter who their supplier may be, usually pay these costs. In some cases, however, customers lose significant benefits of a regulated electric industry and efficient sources of power. Few legislative efforts have addressed this issue.

Background

- Whether due to legitimate historical monopoly investments or inefficient decisions, many states restructuring their electric industry have stranded costs. Stranded costs are generally defined as utility investments that are not recoverable or financially viable at market based prices. These stranded costs are particularly prevalent in high cost states, where they range up to $10 billion in a single state. In most cases, customers are required to cover these costs through a charge at the distribution level.

- Several low-cost states expect to have little or no stranded costs. In fact, it is widely believed that a handful of states will experience 'negative' stranded costs. These negative stranded costs occur when the market value of a utility's assets are greater than their book value.

- Most restructuring legislation allows utilities to recover their stranded costs from customers, but has not made similar efforts to protect consumer benefits.

- A number of state policy makers and regulators in low cost states are considering returning negative stranded costs back to customers. Such actions can off-set short-run cost increases for consumers.

Low Cost States Initiative Position

- Congress should not mandate that utilities be allowed to recover all stranded costs. State governments and regulators are best qualified to determine the appropriate level of stranded cost recovery.

- States should be able to consider if and how to distribute any negative stranded costs.

- If restructuring legislation is adopted, Congress should clarify states' authority to adopt provisions that will allow customers to recover stranded benefits, including appropriate efforts to mitigate any stranded costs.

Economic Development

Issue

- Economic development efforts in many states have succeeded over the last decade in part because of low electricity rates for both residential and industrial customers. As other states restructure their retail electric industry, low cost states could lose part, or all, of their economic development advantage.

Background

- An important selling point for many states in terms of economic development is low cost retail electric power for all classes of consumers.

- Much of the successful economic development has come in areas that have long been underprivileged and underemployed.

- Vertically integrated utilities have traditionally been proponents of economic development efforts because of load and revenue benefits. In a restructured market, where vertical integration will be the exception and not the rule, utilities may no longer have the incentive to work in cooperation with local and state governments for economic development.

- A 1997 report from the University of South Carolina explained that the economic development advantages of low cost states will not only shrink, but will disappear under retail electric competition[5].

- As states restructure their retail electricity industry, high-cost areas are expected to see prices fall, lessening the advantage of low cost states. If retail prices rise in low cost states as a result of federally mandated competition, the competitive advantage in economic development will be unfairly taken away.

Low Cost States Initiative Position

- The Low Cost States Initiative does not question the ability of a competitive retail market to set rates, but is concerned about the inherent unfairness of forcing low-cost state customers to subsidize other states' economic development programs.

- The legislators and regulators of low cost states, and not the Federal government, should decide how and if their particular state will restructure its retail electric industry.

References

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[4]Freshwater, David, Stephen Goetz, Scott Samson, Jeffrey Stone, Tulin Ozdemir Johansson, and Monica Greer. *The Consequences of Changing Electricity Regulations for Rural Communities in Kentucky*. College of Agriculture, University of Kentucky, December 1997.

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Appendix 12
Glossary

Access The right to use part of the transmission or distribution system to send and/or receive electricity.

Affiliate A company that is directly or indirectly controlled by, or shares the same owner as, another company.

Aggregator An entity that brings together retail customers, negotiates on their behalf for a lower price, and purchases their electricity.

Baseload The minimum amount of electric power that a company must deliver to its customers over a given period and at a constant rate.

Bilateral Contract A direct contract that individual consumers or aggregators make with power producers.

Broker Any entity that serves as an agent or intermediary in the purchase and sale of electricity without ever owning either the facilities that produce electric power or the power itself.

Bulk Power Market Purchases and sales of electricity among utilities.

Cogeneration The production of both electricity and some form of useful thermal energy, such as heat or steam, from a single fuel source.

Cogenerator A power plant that produces both electrical and thermal energy.

Commercial Consumer One of three commonly used designations (the others are residential and industrial) used to differentiate among consumer classes of electricity. Commercial consumers consist of nonmanufacturing business establishments including retail stores, hotels, restaurants, wholesale businesses, and educational institutions, among others.

Cost Allocation The process of assigning the costs for the generation, transmission and/or distribution of electricity among industrial, commercial, and residential customers.

Cramming The practice of adding changes to a customer's monthly bill for optional services that the customer has not authorized.

Date Certain The establishment of a specific date by which restructuring efforts are to be implemented.

Default Provider Any entity that, in the transition to retail competition and under retail competition, provides electric generation services for customers who fail or are unable to make their own arrangements for electric generation services.

Demand The amount of electricity, expressed in kilowatts, that is required by customers at a given point in time.

Deregulation 1) Less government oversight. 2) The elimination or relaxation of regulations governing an industry or sector of an industry.

Direct Access A key feature of the restructuring process – the opportunity for consumers to bypass their local utility, the generator of their electricity, and purchase electricity from the generator of their choice (see also Retail Wheeling).

Distribution Service The delivery of electricity through local, low-voltage wires to end-use consumers from high-voltage transmission lines.

Divestiture 1) The requirement that an electric utility separate its generation services from its transmission and distribution services and that it then legally transfer ownership and control of all generation-related assets to a non-affiliated company. Divestiture of generation services is one of three often-mentioned policy options for protecting consumers from the disadvantages of market power (the others are functional separation and structural separation). 2) The term can also refer to the transfer of ownership and control of a utility's transmission or distribution functions to a non-affiliated interest.

Electric Utility Any regulated entity that owns and/or operates facilities for the generation, transmission, or distribution of electricity, and has the exclusive right, within a defined geographic area, to sell customers these services.

Federal Energy Regulatory Commission An independent federal agency within the U.S. Department of Energy that has jurisdiction over rates, terms and conditions of the transmission and the wholesale sales of electricity in interstate commerce.

Functional Separation 1) The requirement than an electric utility segregate its books and records to isolate the generation function from all other functions. Functional separation of generation services is one of three often-mentioned policy options for protecting consumers from the disadvantages of market power (the other policy options are divestiture and structural separation). 2) The term also can refer to the segregation of books and records to isolate the transmission and distribution functions from all other functions of the utility.

Generation 1) The process of producing electrical energy from other forms of energy. 2) The amount of electric energy produced, usually expressed in watthours (Wh), kilowatthours (kWh), or megawatthours (mWh).

Gigawatt (GW) One thousand megawatts (1,000 MW), or one million kilowatts (1,000,000 kW), or one billion watts (1,000,000,000 watts) of electricity. A measure that is often used to describe the capacity of large power plants or of many plants.

Grid A system of interconnected power lines for the transmission and distribution of electricity both locally and nationally.

Independent Power Producers (IPP) Any entity not regulated by the government as a public utility that owns or operates an electricity generating facility and offers electric power for sale to utilities and/or the public (also known as Non-Utility Generators).

Independent System Operator (ISO) A neutral entity, not affiliated in any way with any generation, transmission or distribution market participant, created to operate, control and/or maintain an instantaneous balance of the transmission grid system in a manner that will ensure reliable and fair transfers of electricity between generators and distribution companies.

Industrial Consumer One of three commonly-used terms (two others are residential and commercial) used to differentiate among customer classes of electricity. The classification of industrial consumer is made either because the consumer 1) is a manufacturing, construction, mining, agriculture, fishing, or forestry establishment or; 2) uses an amount of electricity that exceeds some specified limit.

Investor-Owned Utility (IOU) A company, owned and operated by private investors; can be contrasted with a governmental agency or a cooperatively owned organization, that provides utility services.

Kilowatt (kW) One thousand (1,000) watts. A measure of the amount of electricity used by large appliances and households.

Kilowatt-hour (kWh) The unit of electricity for which most customers are charged on their monthly bills (in cents per kilowatt-hour). One kilowatt-hour equals one hour of using electricity at a rate of 1,000 watts. Three and a half-kilowatt hours will provide enough power to keep a 150-watt light bulb on for an entire day.

Load The amount of electric power required at a specific time, or over a specific period of time, by a consumer, circuit, or system.

Market Power The ability of a company, either individually or in collaboration with other companies, to affect the price of electricity in the relevant market.

Megawatt (MW) One thousand kilowatts (1,000 kW) or one million watts (1,000,000 watts). A term that is most often used to measure the output of a power plant. While a large power plant might be 1000MW, the average size of a U.S. power plant is just over 300 MW.

Nonbypassable Charge A charge that all consumers must pay, whether they continue to receive electric service from their present utility or select a new supplier.

Non-Utility Generator (NUG) Any entity not regulated by the government as a public utility that owns or operates a generating facility and offers electric power for sale to utilities or the public (also known as Independent Power Producers).

Pilot Program A program offered by a utility that allows a limited number of customers to select their energy suppliers on an experimental basis.

Poolco A system in which an independent operator, acting as both the central buying entity for electricity suppliers in the region and the single agent for selling power to retail customers and their aggregators, accepts bids from the suppliers to sell their power and then, based on the bids and the demand for power at that time, establishes the short-term market price for electricity.

Power Marketers Entities that buy and sell electricity, but do not own generation, transmission, or distribution facilities. The difference between power marketers and brokers is that power marketers actually take ownership of electricity and also must register with FERC.

Power Pool Two or more interconnected electric systems that seek to obtain greater reliability of service and efficiency of operation by coordinating the development and operation of their electric generation and transmission facilities.

Provider of Last Resort An entity that is legally required to provide service to customers who are not offered electricity service from any competitors.

Public Utility Commission (PUC) or Public Service Commission (PSC) A state authority (in Tennessee the Tennessee Regulatory Authority (TRA) for investor-owned utilities) responsible for the regulation of retail sales of electricity within a particular state.

Public Utility Holding Company Act of 1935 (PUHCA) A federal law that was enacted to address and correct abusive practices by large and powerful utility holding companies that were operating to the detriment of utility ratepayers and shareholders. PUCHA granted the Securities and Exchange Commission the authority to abolish the large holding companies, now known as registered holding companies.

Public Utility Regulatory Policies Act of 1978 (PURPA) Congress passed PURPA with the intent to encourage cleaner, more energy-efficient power production. PURPA has created a new class of non-utility generators "qualifying facilities" (Qfs), that must meet certain ownership, size, and efficiency criteria established by FERC. Once a generator is designated as a QF, it can force a utility to purchase its power, but only at a price that is no higher than the cost that the utility would have had to pay to produce the electricity itself or the cost it would have had to incur to purchase the power from another source (avoided cost).

Qualifying Facility (QF) A term created in the Public Utility Regulatory Policies Act of 1978 that describes a cogenerator or small power producer that meets certain ownership, operating, and efficiency criteria set by the Federal Energy Regulatory Commission.

Regulation A rule established by the federal or state government that sets procedures that a utility must follow. A regulation must first be offered for public comment before it becomes effective.

Reliability Electric system reliability has two components: adequacy and security. Adequacy is the ability of the electric system to supply customers at all times, taking into account scheduled and unscheduled outages of system facilities. Security is the ability of the electric system to withstand sudden disturbances, such as electric short circuits or unanticipated loss of system facilities.

Residential Consumer One of three commonly-used terms (also commercial and industrial) that differentiate among consumer classes of electricity. Residential consumers are made up of private households that consume energy primarily for space heating, water heating, air conditioning, lighting, refrigeration, cooking, and drying clothes.

Restructuring The reorganization of the electric utility industry's market structure. A movement toward a structure that allows consumers to purchase electricity generation services from competing suppliers and away from the traditional regulated monopoly structure, in which utilities receive exclusive rights to generate, transmit, and distribute electricity to serve all customers in their jurisdiction.

Retail Wheeling A method of transmitting power in which utility customers would get direct access to power generators, giving them the option to purchase electricity from more than one provider (also see Direct Access)

Rural Electric Cooperative (Co-op) An independent electric utility that is owned by the consumers it serves and is legally established to provide at-cost electric service. Typically co-ops

are financed initially by the Rural Electrification Administration (REA) and are exempt from federal income tax laws.

Securitization A financial mechanism through which a utility can recover its stranded costs (see "stranded" below) up front, in a single lump sum payment via the issuance of securities, i.e., bonds.

Service Area The geographical territory served by a utility.

Slamming The practice of switching customers from one power provider to another without their consent.

Stranded Benefits Programs funded by a monopoly utility to support environmental protection, fuel diversity, energy efficiency low-income ratepayer assistance, renewable energy, demand side management, etc., that could be compromised or abandoned in a restructured electric industry.

Stranded Costs Costs incurred because the value of utility investments (e.g., investments in nuclear power plants or in purchased power contracts) that were made and are recoverable under regulation cannot be recovered from the sale of the power from such investments in a competitive market.

Stranded Margins Revenue generated because the value of utility investments that were made under regulation is greater in a competitive market than it is under a regulated monopoly structure.

Structural Separation 1) The requirement that an electric utility create a separate subsidiary to run its generation services. The subsidiary would operate in a separate building and have its own employees and financial reporting procedures. Structural separation of generation services is one of three often-mentioned policy options for protecting consumers from the disadvantages of market power (the others are divestiture and functional separation). 2) The term also can refer to the requirement that an electric utility create a separate subsidiary to run its transmission or distribution services.

Supplier Any entity that sells electricity to customers using either its own transmission and distribution facilities or those of another company.

System Benefits Charge A charge on all users of electricity to fund public interest programs, such as energy conservation, research and development, energy efficiency, and low-income assistance.

Transition Charge A cents-per-kilowatt-hour charge added to every customer's bill to recover an electric utility's stranded costs.

Transmission The process of transporting high-voltage electricity from the points of generation to the location of groups of electricity users and low-voltage distribution wires.

True-up Mechanism A method for adjusting for price fluctuations and other changes to prevent the over-recovery of stranded costs. The term typically refers to a provision in legislation or regulation that gives such authority to state regulators.

Unbundled Service Electricity service that is broken down into its basic components. Each component is priced and sold separately. For example, generation, transmission, and distribution could be unbundled and offered as individual services.

Universal Service A policy guaranteeing that all ratepayers receive reliable electric service with no degradation in service quality, and at rates that are just, reasonable, and affordable.

Vertical Integration The structure of an electric utility in which the company owns generation plants, a transmission system, and distribution lines and thus can provide all aspects of electric service.

Watt A unit of measure of electric power at a specific moment in time. Seventy-five watts describes the amount of electricity that a 75-watt light bulb draws at any particular moment.

Wheeling The transmission of power to customers.

Wholesale Competition A market structure where a utility may buy its power from a variety of power producers, and power producers may compete to sell their power to a variety of utilities.

Wires Charge A charge expressed in cents-per-kilowatt-hour that is levied on electric power suppliers or their customers based on the use of transmission and distribution wires.

Partial Source: American Association of Retired Persons.

Appendix 13
Endnotes

[1] 1997 TVA Annual Report.
[2] *The Changing Structure of the Electric Power Industry: Selected Issues, 1998*; Energy Information Administration; 1998.
[3] 1997 TVA Annual Report.
[4] See Appendix 3 for complete listing.
[5] See Appendices 1 and 2 for complete listing.
[6] See Appendices 1 and 2 for a detailed listing.
[7] TVA Information Statement, February 27, 1998.
[8] See Appendix 3 for a detailed listing.
[9] *The Restructuring of the Electric Utility Industry*, Tennessee Valley Public Power Association, September 29, 1998.
[10] Binz, Ronald J. and Mark Frankena, *Addressing Market Power: The Next Step in Electric Restructuring*, Competition Policy Institute, 1998.
[11] Federal Energy Regulatory Commission, Order No. 888, p. 63.
[12] Report of the Tennessee Valley Electric System Advisory Committee, March 31, 1998, p. 10.
[13] See Appendix 4 and 5 for a detailed listing.
[14] See Figure 1 for comparative listing.
[15] White, Mathew W., "Power Struggles: Explaining Deregulatory Reforms in Electricity Markets," Brookings Papers on Economic Acitvity: Microeconomics, 1996, pp. 201-250.
[16] *Wall Street Journal*, April 22, 1998, pp. A2, A4.
[17] See, for example, United States, 105th Congress, HR 655: Electric Consumers' Power to Choose Act of 1997 (Rep. Schafer); HR 1960: Electric Power Competition and Consumer Choice Act of 1997 (Rep. Markey); S 1401: Transition to Electric Competition Act of 1997 (Sen. Bumpers and Sen. Gorton); S 2287: Comprehensive Electricity Competition Act (Sen. Murkowski, by request of the Administration).
[18] TCA § 3-15-801.
[19] Economists often use "average variable cost" as a proxy for marginal cost, especially in situations where production exhibits significant economies of scale. The important similarity between the two cost concepts is that fixed or sunk costs are not included in their calculations. In theory, these fixed or sunk costs become less relevant to the determination of market price as industry output approaches its long run equilibrium level.
[20] The 13 regions used are based on regions and selected subregions of the North American Electricity Reliability Council ("NERC"). Tennessee is included in a region mainly comprised of Eastern Virginia, North Carolina, South Carolina, Georgia, Alabama, and Eastern Mississippi.
[23] See Figure 5 for stranded investment comparisons.
[24] *The Changing Structure of the Electric Power Industry: Selected Issues, 1998*; Energy Information Administration; 1998, p. 60.
[25] *The Changing Structure of the Electric Power Industry: Selected Issues, 1998*; Energy Information Administration; 1998. p. 60.
[26] Similar data for TVA is not publicly available
[27] TVA Presentation, "Reliability and Pricing In A Competitive World," October 7, 1998
[28] TVA Presentation, "Reliability and Pricing In A Competitive World," October 7, 1998
[29] The development of ISOs and transmission unbundling also gives rise to the potential loss of certain efficiencies associated with the joint operation and installation of transmission and generation facilities. Utilities have historically added and operated facilities in a manner which was intended to minimize total bulk power costs. Nondiscriminatory transmission access and independent operation of transmission facilities may result in the loss of some of these efficiencies since it will be very difficult to plan for a least-cost combination of transmission and generation additions in a competitive/ISO structured environment.

The functional separation of transmission and generation may also cause operational and scheduling problems. The scheduling of maintenance activities may be complicated by such separation since generation can be dispatched to relieve constraints caused by transmission line maintenance. Likewise, transmission systems can be

used to deliver electricity to areas normally served by specific generating units during periods when those units are taken off-line for maintenance schedules and the ISO may have a limited ability to resolve such a conflict.
[30] William G. Shepard, "Market Power in the Electric Utility Industry: An Overview," The National Council on Competition and the Electric Industry, November 1997; Harry M. Trebing, "Promoting Consumer Protection in the Changing Electric Utility Industry," The Consumer Research Foundation, 1998; Wayne P. Olson, "From Monopoly to Markets: Milestones along the Road," National Regulatory Research Institute, 1998.
[31] See "Principles and Guideline on the Restructuring of the Electric Industry," Kentucky Public Service Commission, 1998; "Revised Proposed Transition Plan for Retail Competition in the Electric Industry," Mississippi Public Service Commission, June 1998; "Proposed Electric Restructuring Implementation Process," Public Service Commission of South Carolina, February 3, 1998.
[32] The Tennessee Valley Public Power Association proposes to maintain these obligations as markets are opened. See, "Legislative Positions:The Restructuring of the Electric Utility Industry," Tennessee Valley Public Power Association, September 29, 1998.
[33] TVA Information Statement, February 27, 1998.
[34] TVA Information Statement, February 27, 1998.
[35] See Appendix 10 for a detailed listing.
[36] See Appendix 4 and 5 for a complete listing.
[37] *Duck River Electric Membership Corporation v. City of Manchester*. 529 SW2d 202,206, 1975.
[37] *Id.* 208.
[38] *Duck River Electric Membership Corporation v. City of Manchester*. 529 SW2d 202, 206, 1975.
[39] *Id.* 207.
[40] *Id.* 207.
[41] *Consolidated Aluminum Corp. v. TVA*, 462 F. Supp. 464 (M. D. Tenn. 1978)
[42] *Rutherford County v. City Murfreesboro*, 205 Tenn. 362, 326 SW2d 653, cert. denied 361 U.S. 919, 80 S.Ct. 257, 1959.
[43] *Memphis Power & Light Co. v. City of Memphis*, 112 SW2d 822, 1937.
[44] *City of Loudon v. TVA*, 585 F. Supp. 83 (E.D.Tenn. 1984)
[45] These utilities include Kentucky Utilities, Entergy, The Southern Company's Alabama Power and Georgia Power; American Electric Power's Appalachian Power Company, and Duke Power.
[46] Binz, Ronald J. and Mark W. Frankena, "Addressing Market Power: The Next Step in Electric Restructuring," Competition Policy Institute, 1998.
[47] Acts 1997 Ch. 531; T.C.A. 3-15-804.
[48] Fuldner, Arthur H., "Upgrading Transmission Capacity for Wholesale Electric Power Trade," Electric Information Administration, pp. 1-2.
[49] Fuldner, Arthur H., "Upgrading Transmission Capacity for Wholesale Electric Power Trade," Electric Information Administration, p. 2.
[50] A control area is an electrical system, bounded by interconnection metering and telemetry. It continuously regulates, via automatic generation control (AGC), generation within its boundaries and scheduled interchange back and forth across the inter-ties, to match its system load while contributing to frequency regulation of the interconnection. Some utilities operate a control area jointly in a "tight" power pooling arrangement.
[51] Fuldner, Arthur H., "Upgrading Transmission Capacity for Wholesale Electric Power Trade," Electric Information Administration, pp. 3-4.
[52] *America's Electric Utilities: Past, Present and Future* 6th Edition, Leonard S. Hyman, Public Utilities Report, Inc., Arlington, Virginia, March 1997, page 29.
[53] Blackouts are power outages occurring over extended areas of service territory; whereas, brownouts are spot outages or voltage reductions within a service area resulting from intermittent or curtailed power supply.
[54] Steady-state instability can occur if too much power is transferred over a transmission line or part of a system to the point that the synchronizing forces are no longer effective. Dynamic instability (also known as small-signal instability) occurs when normal variations in generation or consumption are too small to be considered disturbances, but initiate oscillations at low frequencies.
[55] Fuldner, Arthur H., "Upgrading Transmission Capacity for Wholesale Electric Power Trade," Electric Information Administration, pp. 4-5.

[56] "Power Pooling on the Southern Electric System," Bulk Power Operations of Southern Company Services, Inc., pp. 23-31.
[57] Fuldner, Arthur H., "Upgrading Transmission Capacity for Wholesale Electric Power Trade," Electric Information Administration, p.2.
[58] *Id.* p.11.